AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

S. HRG. 106–962

COLUMBIA RIVER POWER SYSTEM: BIOLOGICAL OPINION AND THE DRAFT BASINWIDE SALMON RECOVERY STRATEGY

HEARINGS

BEFORE THE

SUBCOMMITTEE ON FISHERIES, WILDLIFE, AND WATER

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDRED SIXTH CONGRESS

SECOND SESSION

SEPTEMBER 13 AND 14, 2000
NOVEMBER 20, 2000—BOISE, ID

ON

A REVIEW OF A DRAFT FEDERAL PROPOSAL TO RECOVER SALMON SPECIES ON THE COLUMBIA AND SNAKE RIVERS

Printed for the use of the Committee on Environment and Public Works



U.S. GOVERNMENT PRINTING OFFICE
71–532 PDF WASHINGTON : 2002

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2250 Mail: Stop SSOP, Washington, DC 20402–0001

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ONE HUNDRED SIXTH CONGRESS
SECOND SESSION

ROBERT SMITH, New Hampshire, *Chairman*

JOHN W. WARNER, Virginia
JAMES M. INHOFE, Oklahoma
CRAIG THOMAS, Wyoming
CHRISTOPHER S. BOND, Missouri
GEORGE V. VOINOVICH, Ohio
MICHAEL D. CRAPO, Idaho
ROBERT F. BENNETT, Utah
KAY BAILEY HUTCHISON, Texas
LINCOLN CHAFEE, Rhode Island

MAX BAUCUS, Montana
DANIEL PATRICK MOYNIHAN, New York
FRANK R. LAUTENBERG, New Jersey
HARRY REID, Nevada
BOB GRAHAM, Florida
JOSEPH I. LIEBERMAN, Connecticut
BARBARA BOXER, California
RON WYDEN, Oregon

DAVE CONOVER, *Staff Director*
TOM SLITER, *Minority Staff Director*

SUBCOMMITTEE ON FISHERIES, WILDLIFE, AND WATER

MICHAEL D. CRAPO, Idaho, *Chairman*

CRAIG THOMAS, Wyoming
CHRISTOPHER S. BOND, Missouri
JOHN W. WARNER, Virginia
ROBERT F. BENNETT, Utah
KAY BAILEY HUTCHISON, Texas

HARRY REID, Nevada
FRANK R. LAUTENBERG, New Jersey
RON WYDEN, Oregon
BOB GRAHAM, Florida
BARBARA BOXER, California

C O N T E N T S

Page

SEPTEMBER 13, 2000

OPENING STATEMENTS

Baucus, Hon. Max, U.S. Senator from the State of Montana 24
Boxer, Hon. Barbara, U.S. Senator from the State of California 1
Crapo, Hon. Michael D., U.S. Senator from the State of Idaho 4

WITNESSES

Bloch, Eric J. Jr., chairman, Northwest Power Planning Council, Portland, OR, on behalf of Governor Kitzhaber 28
Prepared statement 79
Boyer, Lionel, chairman, Shoshone-Bannock Tribes, Fort Hall, ID 17
Prepared statement 74
Cassidy, Frank L., Vancouver, WA, on behalf of Governor Locke 30
Prepared statement 82
Cottingham, David, Special Assistant to the Director, Fish and Wildlife Service, Department of the Interior; accompanied by Howard Shaller, Vancouver, WA Office, Fish and Wildlife Service 48
Prepared statement 96
Etchart, John, Helena, MT, on behalf of Governor Racicot 26
Prepared statement 76
Johansen, Judith A., Administrator and Chief Executive Officer, Bonneville Power Administration, Department of Energy, Portland, OR 47
Prepared statement 93
Kempthorne, Hon. Dirk, Governor, State of Idaho 8
Prepared statement 68
Mogren, Colonel Eric T., Northwestern Division, Army Corps of Engineers, Portland, OR; accompanied by Doug Arndt 45
Prepared statement 89
Penney, Samuel, chairman, Nez Perce Tribal Executive Committee, Lapwai, ID, representing the Columbia River Intertribal Fish Council 15
Prepared statement 73
Stelle, William Jr., Northwest region regional administrator, National Marine Fisheries Service, Seattle, WA 43
Prepared statement 86

ADDITIONAL MATERIAL

McDonald, J. William, regional director, Pacific Northwest Region Bureau of Reclamation, Department of the Interior, prepared statement 96
Recommendations of the Governors of Idaho, Montana, Oregon and Washington for the Protection and Restoration of Fish in the Columbia River Basin 59

SEPTEMBER 14, 2000

OPENING STATEMENTS

Crapo, Hon. Michael D., U.S. Senator from the State of Idaho 99

Page

WITNESSES

Batson, Derrek, Treasurer, Board of Directors, Idaho Salmon and Steelhead Unlimited, Napa, ID 117
Prepared statement 175
Bosse, Scott, Idaho Rivers United, Boise, ID 119
Prepared statement 176
Bouwes, Nick, Biometrician, Oregon Department of Fish and Wildlife, Portland, OR 100
Prepared statement 147
Bowles, Edward C., Anadromous Fish Manager, Idaho Department of Fish and Game, Boise, ID 102
Prepared statement 153
Kutchins, Keith, Anadromous Fish Biologist, Shoshone-Bannock Tribes, Fisheries Department, Ft. Hall, ID 104
Prepared statement 168
Masonis, Robert J., Director, Northwest Regional Conservation Programs, American Rivers, Seattle, WA 121
Prepared statement 180
Patton, Sara, Coalition Director, Northwest Energy Coalition, Seattle, WA 132
Prepared statement 181
Semanko, Norman, M., Executive Director and General Counsel, Idaho Water Users, Boise, ID 135
Prepared statement 187
Spain, Glen, Northwest Regional Director, Pacific Coast Federation of Fishermen's Association, Inc., Eugene, OR 137
Prepared statement 198
Weber, Earl, C. Fisheries Scientist, Columbia River Inter-Tribal Fish Commission, Portland, OR 106
Prepared statement 171

ADDITIONAL MATERIAL

Comments by Idaho Water Users on the Draft Biological Opinion for Operation of the Federal Columbia River Power System Including the Juvenile Fish Transportation Program and the Bureau of Reclamation's 31 Projects, Including the Entire Columbus Basin Project..... 204–252
Federal Caucus, Comments by Idaho Water Users on Conservation of Columbia Basin Fish Draft Basin-wide Salmon Recovery Strategy 195
Résumés:
Craig L. Sommers 249
David B. Shaw 248
James J. Anderson 245
Richard A. Hinrichsen 249
William J. McNeil 250
Statements:
Northwest Energy Coalition 184
Pacific Coast Federation of Fishermen's Associations 201

NOVEMBER 20, 2000—BOISE, ID

OPENING STATEMENTS

Crapo, Hon. Michael D., U.S. Senator from the State of Idaho 253

WITNESSES

Anderson, James, Columbia Basin Research, Seattle, WA 277
Prepared statement 319
Arndt, Doug, Chief, Fish Management Division, Army Corps of Engineers, Northwestern Division, North Pacific Region, Portland, OR 260
Prepared statement 318
Barrie, Thayne, owner, Sunset Sports Center, Boise, ID 296
Prepared statement 341
Benson, Mark J., public affairs director, Idaho Potlatch Corporation, Lewiston, ID 299

Page

Benson, Mark J., public affairs director, Idaho Potlatch Corporation, Lewiston, ID—Continued
Prepared statement 346
Corwin, Scott, PNGC Power 301
Prepared statement 347
Dreher, Karl, director, Idaho Department of Water Resources, Boise, ID 280
Prepared statement 326
Report, Chinook Salmon Survival 332
James, Daniel, on behalf of Pacific Northwest Waterways Association 294
Prepared statement 338
Paulsen, Charles, president, Paulson Environment Research, Lake Oswego, OR 278
Prepared statement 321
Rigby, Richard, program manager, Water Rights in Acquisition, Pacific Northwest Region, Bureau of Reclamation 263
Schaller, Howard, project leader, Columbia River Fisheries Program, Fish and Wildlife Service, Vancouver, WA 260
Prepared statement 318
Schiewe, Michael, director, Northwest Fisheries Science Center, Fish Ecology Division, National Marine Fisheries Service, Seattle, WA 259
Prepared statement 317
Smith, Craig, Northwest Food Processors Association, Salem, OR 297
Prepared statement 343
Thurow, Russell, Fisheries Research Scientist, Rocky Mountain Research Station, Boise, ID 283
Prepared statement 334

ADDITIONAL MATERIAL

Article, Science Shifting on Dam Removals I60339 .....
Letter, NMFS Biological Opinion 334
Statements:
Eames, Matt, senior legislative affairs representative, Idaho Power Company 359
Save Our Wild Salmon, Seattle, WA 353
Saving Salmon in the Pacific Northwest 339

COLUMBIA RIVER POWER SYSTEM: BIOLOGICAL OPINION AND THE DRAFT BASINWIDE SALMON RECOVERY STRATEGY

WEDNESDAY, SEPTEMBER 13, 2000

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON FISHERIES, WILDLIFE, AND WATER,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:31 a.m., in room 406, Senate Dirksen Building, Hon. Michael D. Crapo (chairman of the subcommittee) presiding.

Present: Senators Crapo, Boxer, and Baucus [ex officio].

Senator CRAPO. This hearing will come to order.

This is the Subcommittee on Fisheries, Wildlife, and Water, the hearing to examine the draft biological opinion on the Federal Columbia River power system and the Federal Caucus draft basinwide salmon recovery strategy.

I have an opening statement, but Senator Boxer has not only an opening statement but some testimony to give in another hearing very quickly, and so we are going to go first to Senator Boxer and she will open this hearing today with her opening statement first.

Senator Boxer.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. Thank you so much, Mr. Chairman, for your understanding. It is true that I'm on a panel at the Commerce Committee now, so I will go as quickly as I can.

This is so important. It is wonderful to see the good Governor here from Idaho, because I enjoyed so much when he was here in the Senate. We were on a couple of committees together, as I remember it, and he was always one of the nicest people around here, so we welcome him.

Mr. Chairman, I want to compliment you and your staff for working so closely with me and my staff on the witness list so that we have balanced views. That's always so important.

It would be easy to assume that the debate over the Snake River salmon is of importance only to the people of the Pacific Northwest. While people in Oregon, Washington, and Idaho will undoubtedly be the ones directly impacted by the efforts to save these fish, the salmon, the issue has larger implications that transcend the region and put it on the national radar screen.

At its essence, the debate over Snake River salmon raises tough and fundamental questions about whether we, as a nation, are serious about two of our most important laws, the Endangered Species Act and the Clean Water Act. For me, those are basic, important pieces of legislation that I want to see strengthened rather than weakened.

Now, nobody in this room would challenge the assertion that we've dramatically altered the natural ecology of the once-mighty, free-flowing Snake River. The human impacts on the river system have left a river with water quality that is in extreme violation of the Clean Water Act and a set of salmon stocks that are just barely staving off extinction.

The salmon species in question are of religious and spiritual importance to northwest tribes, they are cultural icons for the region, and they were once an economic mainstay because of the tremendously valuable commercial and sport fisheries they sustained. In fact, the decline of these salmon stocks has led to restrictions on salmon fishermen from central California all the way up to Alaska.

While there are people who argue that we need not save every species from extinction, even opponents of the Endangered Species Act would have difficulty arguing that it is in the region's interest or our Nation's interest to watch these particular fishruns go extinct. In fact, it would be hard to find a species more deserving of protection than these salmon. If we are not serious about saving them or restoring the water quality in the river, it is hard to know under what circumstance we would ever be serious about saving a species. Yet, for decades we have either avoided the issue or employed expensive but unsuccessful recovery tools. The result has been that we have had to watch as these fish continue their precipitous decline toward extinction.

I take this issue particularly serious because I view our commitment and success in saving the Snake River salmon as a good indicator about how we plan to handle the many listed salmon stocks in my State.

Interestingly, many of the major newspapers in my State have made this connection and have editorialized in favor of removing the four Lower Snake River dams to recover the salmon. I know this is extremely contentious.

Similarly, I have been contacted by many California fishermen, conservationists, and sportsmen, who support serious efforts to save Snake River salmon because they view it as an indicator of how the Federal Government will approach salmon recovery in my State.

Unfortunately, I must say that I am concerned that the draft biological opinion that has been produced will do little to steer us toward more effective Snake River salmon recovery efforts. The opinion appears to rely on recovery strategies such as trucking and barging that have already cost millions of dollars but have been basically ineffective.

The opinion avoids the issue of dam removal, which Federal scientists have suggested is the clearest and most certain route to salmon recovery.

To me, it would be all right if it went that way if there were aggressive alternatives to compensate for not taking down the dams.

The plan lacks an adequate mechanism for triggering emergency recovery actions should the proposed strategies fail.

I'd like to see a plan that has more specific performance standards and timelines for meeting those standards.

Having said this, I'm not suggesting that this draft opinion be jettisoned in lieu of some alternative planning effort. The last few decades we have planned for and studied these salmon stocks nearly to the point of extinction. It is vital that this biological opinion be reworked to present a more realistic recovery strategy for Snake River salmon. It is also very vital that we keep this effort moving forward and produce a good biological opinion in a timely way. The last thing we need is to further delay the important decisions that must be made.

We have an obligation to fulfill the mandates of our Federal environmental laws, to meet our treaty commitments to the Native American tribes, and to preserve these species for future generations.

So, Mr. Chairman, again, it is most unfortunate for me that I must leave, but I am leaving this hearing in your great hands and will be briefed thoroughly and will try to get back here if I can give my testimony quickly.

Again, welcome to you, Governor, and to all of our fine witnesses today.

Thank you so much, Mr. Chairman.

Senator CRAPO. Thank you, Senator Boxer.

[The prepared statement of Senator Boxer follows:]

STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Mr. Chairman, I want to thank you for holding this oversight hearing to address the important questions surrounding the recovery of the listed Snake River salmon runs. The size of our witness list is a good indication of just how complex and controversial this issue is. It would be easy to assume that the debate over these Snake River salmon is of importance only to the people of the Pacific Northwest. While people in Oregon, Washington, and Idaho will undoubtedly be the ones most directly impacted by efforts to save these fish, the issue has larger implications that transcend the region and place it squarely on the national radar screen. At its essence, the debate over Snake River salmon raises tough and fundamental questions about whether we as a nation are serious about two of our most important Federal environmental laws—the Endangered Species Act and the Clean Water Act.

Nobody in this room would challenge the assertion that we have dramatically altered the natural ecology of the once mighty, free-flowing Snake River. The human impacts on the Snake river system have left a river with water quality that is in extreme violation of the Clean Water Act and a set of salmon stocks that are just barely staving off extinction.

The salmon species in question are of religious and spiritual importance to Northwest tribes; they are cultural icons for the region; and they were once an economic mainstay because of the tremendously valuable commercial and sport fisheries they sustained. In fact, the decline of these salmon stocks have led to restrictions on salmon fishermen operating from central California all the way up to Alaska.

While there are people who argue that we need not save every species from extinction, even opponents of the Endangered Species Act would have difficulty arguing that it is in the region's interest—or our nation's interest—to watch these particular fish runs go extinct. In fact, it would be hard to find a species more deserving of protection than these salmon. If we are not serious about saving these salmon or restoring the water quality in this river—it is hard to know under what circumstance we would ever be serious about it.

Yet, for decades we have either avoided the issue or employed expensive, but unsuccessful recovery tools. The result has been that we have had to watch as these fish continued their precipitous decline toward extinction.

I take this issue particularly serious because I view our commitment and success in saving the Snake River salmon as a good indicator of how we plan to handle the many listed salmon stocks in my State. Interestingly, many of the major papers in my State have made this connection and have editorialized in favor of removing the four lower Snake River Dams to recover the salmon. Similarly, I have been contacted by many California fishermen, conservationists, and sportsmen who support serious efforts to save Snake River salmon because they view it as an indicator of how the Federal agencies will approach salmon recovery in my State.

Unfortunately, I must say that I am deeply concerned that the draft biological opinion that has been produced will do little to steer us toward more effective Snake River salmon recovery efforts. The biological opinion appears to rely on recovery strategies, such as trucking and barging, that have already cost millions of dollars, but have proven relatively ineffective. The opinion avoids the issue of dam removal—which Federal scientists have suggested is the clearest and most certain route to salmon recovery—but offers few really aggressive alternatives to compensate. The plan also lacks an adequate mechanism for triggering emergency recovery actions should the proposed strategies fail. I would like to see a plan that has much more specific performance standards and timelines for meeting those standards.

Having said this, I am not suggesting that this draft biological opinion be jettisoned in lieu of some alternative planning effort. For the last few decades, we have planned for and studied these salmon stocks nearly to the point of extinction. It is vital that this biological opinion be reworked to present a more realistic recovery strategy for Snake River salmon. It is also vital that we keep this effort moving forward and produce a good biological opinion in a timely way. The last thing we need is to further delay the important decisions that must be made.

We have an obligation to fulfill the mandates of our Federal environmental laws, to meet our treaty commitments to the Native American tribes, and to preserve these species for future generations. I look forward to hearing from the witnesses how this biological opinion might be improved to achieve those goals.

OPENING STATEMENT OF HON. MICHAEL D. CRAPO, U.S. SENATOR FROM THE STATE OF IDAHO

Senator CRAPO. We do appreciate our good working relationship, and I'm sure that we will have plenty of opportunities to discuss this issue.

The Pacific Northwest region of the United States is the home to several sub-species of culturally, economically, and biologically significant species of anadromous fish—fish that spawn in fresh water, migrate to the Pacific Ocean, where they reach maturity, and then return to their fresh water birthplace to spawn and die, their carcasses enriching the ecosystem that feeds the newly hatched young.

Twelve of these sub-species of salmon and steelhead are currently listed for protection under the Endangered Species Act. Note that there are also several ESA-listed fish and wildlife species in the Pacific Northwest, including bull trout and Kootenai River white sturgeon.

There are certainly many relationships between these species and other aquatic and terrestrial species and their potential risk for extinction; however, the primary focus of this initial hearing must necessarily be on the ESA-listed salmon and steelhead.

Several decades of work by Federal, State, and tribal governments and many organizations and individuals have failed to stop the steady decline of these fish. These efforts have cost taxpayers and electricity ratepayers an estimated $3 billion, yet the fish have continued to decline to the point where they may soon become extinct.

Extinction of these salmon and steelhead is culturally abhorrent to the northwest and illegal under the Endangered Species Act and

would violate tribal treaties and Federal commitments to the fisheries.

Extinction must be avoided and recovery must happen.

How to recover these fish is controversial and laden with economic impacts, cultural and spiritual emotion, scientific intrigue, and courtroom maneuvering as well as publicity spinning.

Let me state very clearly at this point that I do not yet see any justification for an aggressive flow augmentation program. The evidence to me shows that a flow augmentation approach will not save the salmon.

At the same time, I do not disagree with the draft biological opinion's approach, which does not recommend removing the dams on the Lower Snake. At this point I see no political support for such action, and believe that such a recommendation would put the region into economic and political gridlock in such a way that would prohibit even further efforts to make reasonable steps to save the salmon.

The National Marine Fisheries Service, the Fish and Wildlife Service, and the rest of the Federal action agencies, together known as the "Federal Caucus," have produced a draft biological opinion and a draft basin-wide salmon recovery strategy. These draft documents will soon lead to the biological opinion and then to the recovery plan that will dictate activities in the Pacific Northwest that seek to recover ESA-listed anadromous fish.

Yesterday, my friend and colleague, Senator Gordon Smith of Oregon, held a hearing at which many of the same Federal Caucus witnesses that are with us today testified. My understanding is that Senator Smith's hearing focused proper attention on regional energy and economic issues. Senator Smith makes a very good point that needs to be heard and understood throughout the region, but most particularly heard by members of the Federal Caucus. That message is that the Federal Government must get this right and do the things that make sense and work now, while we have this window of opportunity.

Senator Smith and his colleagues on the Water and Power Subcommittee have made very positive contributions to steering this process in the right direction, and I look forward to considerable consultation between the two subcommittees as we move forward.

Very significantly, for the first time in history the four Governors in the Pacific Northwest States of Idaho, Montana, Washington, and Oregon have jointly released a series of recommendations that outline the process the Governors feel must be followed to achieve anadromous fish recovery. Getting the four Governors together to produce their recommendations, given the widely varied constituencies they must each represent, is remarkable and encouraging.

Let me note the openness, the transparency, and the real collaboration that characterize the process used by the Governors and their staff in preparing their recommendations. The four Governors have done a good job in identifying both the proper focus on where the real problems are and the real balance among the various solutions that are available.

The Federal Caucus would have done well to have followed the same type of process. Instead, I had to file a FOIA request to find out what the Federal Caucus was doing, and even then faced oppo-

sition in full disclosure. Many of the others in the region still feel that they do not and have not had an opportunity to have real collaborative input into the Federal decisionmaking process.

The Northwest Power planning Council has commenced a series of public hearings in the Pacific Northwest to discuss draft amendments to its Columbia River Basin Fish and Wildlife Program. The Northwest Power Planning Council is an interstate compact of the four Pacific Northwest States, charged by the Pacific Northwest Power Planning and Conservation Act of 1980 to protect and enhance fish and wildlife, while assuring the Pacific Northwest's electric power supply.

The Northwest Power Planning Council seeks to develop and monitor the implementation of this fish and wildlife program by the Bonneville Power Administration, the U.S. Army Corps of Engineers, the Bureau of Reclamation, and the Federal Energy Regulatory Commission.

While the Northwest Power Planning Council program deals with a wide range of species and habitats, the fact is that the primary focus is on the ESA-listed anadromous fish and the effects of the hydroelectric system on these fish.

There are an enormous number of interests throughout the Pacific Northwest that must be heard and understood. These interests' perspectives must be given a thorough review, and their recommendations about how we can recover these wild fish must be given equal consideration.

I trust that all interests want to recover wild salmon and steelhead. The debate is about how to best get the job done.

We are particularly concerned that the cultural and economic interests must be satisfactorily considered. Without collaboration from the economic interests and without great sensitivity to the cultural aspects of this issue, it is highly unlikely that any recovery plan will have enough public support to be implemented.

Given these facts, I want everyone in the region to understand that this hearing is but the first, and we are now scheduling subsequent hearings, including field hearings in the Pacific Northwest. I want everyone to be heard by this subcommittee.

The primary purpose of this subcommittee's hearing here is to examine the science used to develop the draft BIOP opinion and the draft recovery strategy. We will examine in detail the processes and assumptions used to develop the science. We will look at the implications of the scientific conclusions. The proposal's recovery standards, the balance of effort among various measures aimed at each of the H's—Habitat, Harvest, Hatchery, and Hydrosystems—and the various aspects of the computer models used to assemble the draft documents will all be examined.

Let me describe the role of science, as I see it. Science, economy, and culture will all be partners in recovering these wild anadromous fish. Recovery must first be based in science, and we must get the science right.

We must not fear good, accurate science. Some worry about where good, accurate science may lead us, and as a result may seek to manipulate scientific processes or mischaracterize scientific hypotheses and conclusions.

Such activity, in my opinion, is a disservice and it can only bring further gridlock and more severe penalties to the Pacific Northwest. I urge people from all perspectives to insist on good science and be willing to recognize it when we find it.

The approach I prefer is to understand the good science and then let the people and the policymakers use that science to craft a recovery plan that gives the economic and cultural partners the trust they need to be advocates and participants in recovery.

The imposition of bad process or bad science will result in distrust and retreat into self-interest. Such a tragic path backward will have severe penalties for the Pacific Northwest and ultimately result in the loss of these incredible fish.

There is too much at stake to allow our limited resources to be applied to false schemes or solutions. We have got to get the science right.

If I understand the direction that we appear to be taking now as a result of the Federal Caucus' action, we now have a window of time—6 to 8 or 10 years—to evaluate other options and take other options and take steps toward solutions that will seek to recover the fish before evaluation of dam breaching is then brought back to the table for further reconsideration. That means we have a short window of time in which we must do things right. Otherwise, if we continue to spin our wheels or make wrong decisions about how to approach recovery, we will, in 5, 6, 8 years be once again facing the difficult question of whether the region must breach the dams to save the fish.

I believe that other solutions can work and other solutions will work if we can find the right approaches and move ahead now. That's one of the main purposes of this hearing is to make sure that we take this opportunity that we have to find the right path forward so that if and when the time comes that we have had experience with proposals that we believe will work, we can then give them the kind of evaluative resolution that they need.

We have today a number of panels. I believe that all of the witnesses have received instructions, but I want to remind all of the witnesses, particularly because we have such a long list of witnesses, that we encourage you to follow the lights.

Each witness has been given the opportunity to submit written testimony. That written testimony is a part of the record and will be accepted and reviewed carefully by the Members and by the staff.

I have seen a couple but very few witnesses who have been able to say in 5 minutes everything they wanted to say in their testimony before this subcommittee, and I just encourage you to recognize that we need time for give-and-take between the Senators and the witnesses, and to limit your verbal remarks to the 5-minute limit.

The green light will be on for 4 minutes. The yellow light comes on when 1 minute remains. The red light means that you should sum up very quickly your thought at this point and trust that anything you didn't get said will either be brought out in questions or reviewed in your written testimony. Witnesses will also certainly have the opportunity to submit further testimony, as we usually

keep the record open for a period of days to allow things to be supplemented and corrected.

If any witnesses go over, I don't want you to be offended, but I will remind you that you are going a little long and encourage you to wrap it up.

Our first panel today is the Hon. Governor Dirk Kempthorne.

Governor, we welcome you.

Governor Kempthorne is not only a good friend and colleague of mine, but the former chairman of this subcommittee, and so he has a lot of experience not only with the Senate but with these issues, as well.

Governor Kempthorne, we welcome you here today. We encourage you to share with us the insight that you have now as Governor, having formerly been the Senator for the State of Idaho.

You are free to begin your remarks.

STATEMENT OF HON. DIRK KEMPTHORNE, GOVERNOR, STATE OF IDAHO

Governor KEMPTHORNE. Senator Crapo, thank you very much. I am honored to serve in this capacity on behalf of the people of Idaho, but to join you and to testify before your committee. It is a pleasure to see you as well as the staff members that I appreciated working with.

I would also like to acknowledge that Attorney General Al Lance of the State of Idaho is with me today.

Mr. Chairman, I appreciate the opportunity to appear before you and to give you Idaho's perspective on one of the most complex issues of the day, salmon recovery in the Pacific Northwest.

One week ago today I was at Redfish Lake, 900 river miles inland from the Pacific Ocean near Stanley, ID, just over the summit from Sun Valley. The lake's name originated from the color of the beautiful salmon returning to spawn in their birthing waters.

I was joined by the Idaho Department of Fish and Game, legislators, and school children from Filer and Stanley to observe and assist the 36 marvelous salmon finish their return from the ocean. These wild and hatchery salmon had returned to spawn and start the cycle anew.

It is Idaho's intent that those schoolchildren who were with me last week and their children, as well, will grow up to see the restoration of the sockeye, as well as all stocks of Idaho's salmon. Our commitment to this goal is unquestionable. The question before this panel is to what extent the Federal agencies will help the States in this effort.

I have long believed that only through a regional collaborative effort will there ever be a real chance for recovery of anadromous fish in the Pacific Northwest.

This past summer, Governor Racicot, Governor Kitzhaber, Governor Locke, and I decided that it was time to sit down and work together to cross State lines, partisan boundaries between two republican Governors and two democrat Governors, and see if it was possible for us to reach a consensus on salmon recovery. In July I was proud to announce, with the other Governors in the region, an unprecedented agreement on the essential principles for recovery and recommendations to implement them.

The agreement recognizes that every State in the region and all of the stakeholders impacted by this process must step forward and contribute. No one State can recover salmon, alone, just as no single State can afford to shoulder a disproportionate burden of the process. Only through regional cooperation—not dictates by the Federal Government—is there a chance to achieve real success.

The four Governors' strategy involves several key elements important to Idaho. First, the Federal agencies should document the benefits of flow augmentation and the precise attributes of flow that make it beneficial.

Second, harvest impacts must be reduced on listed wild fish in the ocean and Columbia River. Idaho has been blessed with a great return of salmon this year—in fact, the most in nearly a quarter of a century. Most were hatchery fish and, therefore, not counted toward Endangered Species Act listed salmon or for salmon recovery.

Third, the region must implement actions now that can and should be done without breaching the four Lower Snake River dams.

Finally, predation of all kinds, including terns and marine mammals, must be limited.

I want to publicly express my appreciation to Governor Kitzhaber, Governor Racicot, and Governor Locke for their diligence and cooperation in achieving this historic milestone. The gentlemen here today to speak on their behalf also played key roles.

This document is a framework for a comprehensive approach in dealing with the four H's of salmon recovery—Habitat, Harvest, Hydropower, and Hatcheries. Throughout each of these areas, it reflects the importance of what I have heard referred to as "the fifth H"—Humans. We recognize that the Columbia River Basin is not only an unparalleled natural resource, it is also a dynamic economic engine. For both reasons, it is critical to the well-being of the four States in the region.

This agreement is not a recovery plan. We cannot create one unilaterally. The salmon are a federally-declared endangered species, and, as such, all of Federal laws—the Endangered Species Act, the Clean Water Act, and dozens more—govern what our States can and cannot do, and our States cannot and should not shoulder the full financial costs of recovering these endangered species.

But, while we cannot create a recovery plan, we can create something that the Federal Government so far has found difficult to do, and that is to create consensus in the Pacific Northwest. If the salmon recovery plan is to be one that is workable, then I believe it has to meet three tests. It has to be supported biologically, it has to be supported economically, and it has to be supported politically.

This agreement meets these three tests, but I remain firm that the only way we will see results in the region is if State law is respected and the local citizens are brought into the process from the beginning. It must respect the principles of private property rights, and any additional waters acquired through a willing seller/willing buyer basis.

Idaho is willing to do its part, and so are the other States. This document is a testament to our commitment.

The question now is to what extent the Federal Government provides support on a policy level, as well as a financial level, to help us achieve this goal. The fact that release of the biological opinion on salmon recovery was delayed repeatedly underscores the difficulty of the Federal agencies' role in this debate to reach consensus.

As Governor Kitzhaber noted at our press conference in July, the Federal Government is spending more than $400 million a year on salmon recovery. It has not been well coordinated. It has not been focused. It has not had strict accountability measures to achieve the defined results.

So if I had to boil down our advice to the Federal Government of the United States of America, I would do it in four words: listen to the States. These are the States united in the recovery of salmon. We share the same commitment to recovering these remarkable species. We have taken the time and made the hard choices to reach consensus in the region, and we've created this comprehensive road map to recovery. We are at the table.

Idaho is optimistic that the State and regional stakeholders are joined together to empower themselves throughout this process; however, Idaho remains concerned that the All–H paper has failed to give deference to the objectives outlines in the four Governors' recommendations.

At the end of the day, the best solutions are those that are owned by the participants rather than those that are imposed by Federal edict.

Mr. Chairman, I would ask consent that the recommendations of the four Governors be made part of the public record, and I would thank you again for this opportunity to speak to you and would note also, Mr. Chairman, that I've made my extended comments available for the record.

Senator CRAPO. Without objection, these documents will be available and made a part of the record.

Governor Kempthorne, first of all let me again thank you for coming to testify today. I realize 5 minutes is a very short period of time to cover a topic such as this. But let me just go through a couple of the areas that you raised.

I note that at the front of your testimony you talked about the need to justify flow augmentation, if it can be justified. Does the State of Idaho have a position on the flow augmentation as a source of remedy in recovery of the salmon?

Governor KEMPTHORNE. Mr. Chairman, the State of Idaho will be making, as part of its findings with regard to the BIOP, a detailed analysis of flow augmentation. We do not believe that flow augmentation provides the benefit that some in the Federal Government suggest that it does.

We think that there is, in some quarters, the idea that flow augmentation is being promoted so that it would divide different parties; that if breaching is not possible, then let's use flow augmentation. Flow augmentation, therefore, if we can reach the point of a painful threshold, would then cause some to say, "We can't provide that much water, let's now turn back to breaching,"

So no, I do not believe that flow augmentation is the key.

Mr. Chairman, if I may, I find it astounding that, when we look at all of these elements that are obstacles to the recovery of salmon, if I specifically point out the Caspian terns, where there was agreement by the Corps of Engineers, by other Federal agencies, that they would relocate these Caspian terns, because it is estimated that they are consuming up to 15 to 25 million smolt before they ever get to the ocean.

A plan was implemented, and then a lawsuit was filed. Part of the lawsuit's justification was pointing to the Fish and Wildlife Service that the consumption of these smolt was not that significant of an impediment to the return of salmon.

Mr. Chairman, I am not a biologist, but if a smolt is consumed it will never return as a salmon—15 to 25 million.

So, I believe that those are some of the objectives that we ought to be looking at, as opposed to saying to the State of Idaho, "You provide additional water."

Senator CRAPO. You've identified a dichotomy there that I think many of us have lived with in the State of Idaho, in particular, but in the Pacific Northwest, in general, and that is the conflict that has arisen between the two what I've called "sideboards" of this issue; namely, flow augmentation, or taking water to try to flush the fish past the dams, or dam breaching to try to lower the water levels and return to a normal river situation.

You are correct that in the past there has been this competition between those two interests, although in the more recent past I think there has been some kind of mending of fences between those who are on the different sides of those issues.

It seems to me that, as we address this issue, we have to remember that there are not just the economic consequences of dam breaching that we have to address, but also the economic consequences of heavy flow augmentation, and in that context it seems to me that, if the science were to show that flow augmentation worked, we would have an even more difficult dichotomy to deal with, but the science that I have seen seems to indicate that the impact of flow augmentation on the speed of helping the fish to get to the ocean or in other contexts is not significant.

Is it my understanding that that is the position that the State of Idaho is going to take?

Governor KEMPTHORNE. I concur with you, Mr. Chairman. Our Idaho Department of Water Resources will provide extensive information about flow augmentation in response to the BIOP.

Also, Mr. Chairman, I would just point out that, in this four-Governors agreement, we call for the Federal Government to provide its scientific justification of flow augmentation, that it not simply be assumed n automatic that flow augmentation is the solution, because I do not believe that it is, and I appreciate that the other Governors have also called for that scientific justification.

When you mentioned the dichotomy, Mr. Chairman, of a number of factors, again, I have to thank the other Governors of the other three States because this was difficult to achieve consensus and, as you indicated, with our different constituencies, our different economies, so this is a significant document and I hope that the Federal Government will seriously look at this as a foundation.

Senator CRAPO. I think it is a very significant document and I have the same hope.

I believe also that one of the things the document does is it seeks to achieve what I know that you and I and many others have been talking about for some time, and that is to recognize not only the science and where we think the science is best guiding us, but also, as you indicated, the biology that would be the science, I think, and then the economic and the political realities that we face in the Pacific Northwest.

It is going to be very difficult to find a balance between those three factors that you identified; however, it is not avoidable. It is a necessity.

It seems to me that, between the remedies of dam breaching and river flushing, there are many, many options that we can take, and I view the Governors' document, the Governors' proposal as an effort to find the most effective path forward between those two parameters.

I was just wondering if you believe that I am—am I viewing it in the correct posture there?

Governor KEMPTHORNE. I believe so, Mr. Chairman, and I appreciate your approach to this question.

When you talked about variety of opportunities and options that we may pursue, in my extended comments, which have been made part of the record, I have gone through in some detail, so I won't be redundant because of the time requirements. I would just affirm, Mr. Chairman, one of the points that you made, and that is it has been suggested that it would be 8 to 10 years before the issue of dam breaching would be back before Congress.

I also will point out that the Corps of Engineers has indicated that there's anywhere from 5 to 10 years of silt that it has estimated have built up behind the dams.

If you take the amount of time politically that may be necessary to reach the question of breach—and then, of course, I think there would be court challenges by a variety of groups—if you ever were to see the breach, and then another 5 to 10 years for the silt to be cleansed through the river system, you are talking conservatively 20 years. It would be absolutely wrong for elected officials to sit idly by, put all of their faith in that solution, and say that for 20 years, therefore, there's nothing we can do.

I don't buy it, and that's why the four Governors have stepped forward with what I think is a doable plan. Our attitude is to do the doable, do it now, and I think we'll see the return of salmon.

I'm delighted also that this year was the best return of the sockeye that we have seen in nearly a quarter of a century.

Senator CRAPO. That's a very good point. If we do the doable and what the region and the consensus that can be built in the region finally comes to as an understanding of the best part of the doable that we can do—in other words, if we find the best path and do it—then, whatever the result of it is, we will have the benefit of knowing what happened and why, and we can then make very well-guided decisions at that point in time.

You talked a lot in your testimony about collaboration and consensus-building. I happen to agree with you that no recovery plan on salmon—in fact, I think no major issue that impacts a re-

gion such as this does—will be resolved unless there can be a consensus at the political and economic as well as the scientific levels built to move forward, and so I very strongly agree with you on that.

Those in the Federal Caucus already know that I have very strong concerns about what I believe to be a lack of collaboration on the part of the process that I have seen for the last couple of years. We may have some disputes among each other about how much collaboration is happening and what really collaboration is and should be.

However, the question I have for you is: what has been your experience in working with the Federal Caucus from the State of Idaho's perspective?

Governor KEMPTHORNE. Mr. Chairman, individually there are some very dedicated individuals in the Federal Government that are working on this issue. My concern and my frustration has been the process, not the individuals.

The fact that we have asked for information, the fact that we have asked to be at the table——

Senator CRAPO. Do you believe that the State of Idaho is at that table?

Governor KEMPTHORNE. No. I do not.

Senator CRAPO. Go ahead. I didn't mean to interrupt.

Governor KEMPTHORNE. I believe that the State of Idaho is at the table with the other three States, and the State of Idaho has joined in a document that we have now submitted to the Federal Government.

This is a collaborative process, and, again, I have sought through different forums, meetings with different members of agencies or different members of the Cabinet expressing my views, my concerns, but I do not feel that we were invited to the Federal table in a collaborative process as they developed this BIOP.

Senator CRAPO. Again, I know we are probably restating it, but do you think that we can get to a plan that can be regionally accepted and effectively implemented unless that happens?

Governor KEMPTHORNE. No, I do not, Mr. Chairman.

If this were easy, it would have been done years ago, and the All–H paper that came out by the Federal Government made it very clear there is not a silver bullet, there is not one solution. It is a matrix of a variety of options, and it is a combination that will be necessary.

Any time you have that many options with that many people involved, you must seek cooperation and collaboration.

Again, I will point to the fact that I think that for it to be successful the participants must feel that they have ownership of this. That doesn't mean that it is everything that every one of us would like. I fully realize that there will be give and take. There will be things in there—the language of this is not necessarily as I would have written it. I will tell you, Mr. Chairman, that Idaho undertook writing its proposed salmon recovery recommendations. I did not release them because I knew that if we could achieve this document with the other three States, the other three Governors, this carries real power, and I think the other Governors felt the same thing. They may have been working on their recovery suggestions.

This is now regional because we are talking about a species that is native to this region.

Senator CRAPO. I agree with you, Governor, that the process seems to be the biggest part of the problem, as opposed to the individuals that are trying to make the process work. I, too, have had the same experience. There are a lot of very well-meaning and good people working on this issue that try to be as responsive as they can, given the parameters of their responsibilities.

The concern that I have—one concern that I have, though, is that when we talk about collaboration and building consensus we may not all hear the same thing when we hear those words. What I'm thinking is that often when I make the charge that collaboration is not happening, the response that comes back is, "Well, we're keeping people informed." Sometimes I disagree with whether they are being kept informed. But I wanted to explore with you a little bit about what true collaboration is.

As I see it, for people to get the ownership that you talk about, they must be true participants in the decisionmaking and not simply informed constituents told about what was being done or what is going to be done or given regular updates along the way.

Could you elaborate on your concept of just what it really means? What kind of collaboration do you believe we need to achieve with the Federal Government on this issue?

Governor KEMPTHORNE. Mr. Chairman, I would use perhaps as an example the Safe Drinking Water Act, which, when I was chair of this committee, we were successful in getting passed through Congress and signed by the President. That was a tough issue.

It was by sitting down with local, State, Federal officials, seeking their input so that they then would testify on behalf of the ultimate document that I believe brought about the success in that, but they felt that they had a piece of that document, ownership, because they had been invited to the table. They could point specifically to language that they knew was a result of their participation, rather than just being handed a document and told, "This is now what you need to support."

That is what will work, and it is not political because this document represents the work of two democrat and two republican Governors. It represents the work of outstanding staff by all of those individuals involved.

So I will add, Mr. Chairman, that yesterday I had a meeting with Secretary of Commerce Mineta. Today, I will have a meeting with Secretary of Interior Babbitt. So we had good discussions about this issue and what we are seeking, and what we have provided is, we hope, a foundation.

Again, the meeting that I had with Mr. Mineta and his staff I felt very good about, but I have also sat with a number of Federal officials from different agencies, when we have talked about certain solutions, only to find that ultimately they cannot agree and there can be finger pointing.

Senator CRAPO. Just one other question. You did raise the point in your testimony that you felt that where you see the Federal plan headed—and we don't know exactly where it will get, at this point, but where you see it headed is not necessarily where the four Governors have recommended. Could you elaborate on that just briefly?

Governor KEMPTHORNE. Well, there are different elements there, Mr. Chairman. I don't want to preclude that, through the process of providing information in our input and perspective to the Federal agencies, that that BIOP cannot be brought around to being much more in line with this document. That was part of my discussion yesterday with Secretary Mineta. It will be my conversation with Secretary Babbitt. I'd like to see this as the foundation, the four Governors' recommendations.

There are elements of the BIOP that are compatible. There are also others that are not.

To give you a couple specifics, as you have asked, it is very important for the irrigators in the State of Idaho that, with regard to the Bureau of Reclamation projects, that those do not take a secondary role to the Federal Columbia River Basin system, so that in the name of the salmon that that water then—we lose the rights of it.

Also, we need to affirm repeatedly, State water rights; that if there is additional water that would be asked for, it is based strictly upon State water law, which is based upon willing seller/willing buyer.

Also, Mr. Chairman, that, if an agreement is reached, that at some point later in the future the Federal Government doesn't come and present in the name of the Endangered Species Act a recommendation, if not a requirement, that now the other language that has been agreed to is null and void because the ESA takes precedent over that. There needs to be certainty in an agreement.

Senator CRAPO. Thank you, Governor. We could go through a lot more, but I know there are other witnesses that need to come forward and our time is somewhat limited.

I, again, appreciate your coming forward. You have been one of those who has really fought for reform in a number of areas very successfully, and we appreciate your efforts on this issue, as well.

Governor KEMPTHORNE. Well, Mr. Chairman, thank you very much. This committee is in outstanding hands with your chairmanship.

Senator CRAPO. Well, thank you very much.

Governor KEMPTHORNE. Thank you.

Mr. Penney and Mr. Boyer, we appreciate your being here with us today. I've already given all the instructions, so let's begin. We'll start with you, Mr. Penney.

STATEMENT OF SAMUEL PENNEY, CHAIRMAN, NEZ PERCE TRIBAL EXECUTIVE COMMITTEE, LAPWAI, ID, REPRESENTING THE COLUMBIA RIVER INTERTRIBAL FISH COUNCIL

Mr. PENNEY. Thank you, Mr. Chairman.

My name is Sam Penney. I am chairman of the Nez Perce Tribal executive committee. I thank you for this opportunity to testify here this morning.

I am pleased to be here today to speak on behalf of the Nez Perce Tribe and the Columbia River Intertribal Fish Commission. As you know, we received voluminous draft documents from the Federal Government on July 27. We are still in the process of reviewing these documents, particularly the technical aspects.

However, I would like to say at the outset that the tribe's position supporting dam breaching the Snake River Dams, our position supporting this is still the same, and we do support an economic investment package to local communities affected by breaching these dams remain unchanged.

We see no new science or information that would indicate other actions will be sufficient to recover Snake River chinook throughout the range of their current habitat.

I would like to offer the following observations:

The Federal proposal fails to rebuild salmon runs to honor the tribes' treaty fishing rights. We have repeatedly requested the Federal Government to honor its legal and moral obligations under our treaties within a meaningful time period that will protect our treaty-secured fishing rights.

We have set forth tribal proposals to this end in our spirit of the salmon plan and in hundreds of pages of documents to the Federal Government. Instead, the Federal plans are singularly focused on museum piece management.

The Federal proposal fails to comply with the Clean Water Act. The U.S. district court recently reaffirmed that the Corps of Engineers must comply with federally-approved water quality standards for temperature and dissolved gas in the *National Wildlife Federation* v. *Corps of Engineers* litigation.

The Federal proposal does not contain actions that will be implemented to achieve these standards.

The Federal proposal is a plan for extinction of the Snake River salmon stocks.

The Federal proposal sanctions the extinction of spring chinook index stocks in tributaries of the Salmon River where salmon habitat is pristine.

The Federal proposal fails to recognize that, if the dams are not breached, large amounts of additional water from the Upper Snake River will be required for flow augmentation to provide the survival benefits that juvenile salmon need.

The Federal proposal's reliance on yet-to-be developed performance standards to delay breaching the four Lower Snake River dams and to get the hydrosystem out of jeopardy ignores the most significant performance standard—the status of the fish.

The risk of extinction for Salmon River stocks has been significantly reduced since they were listed under the Endangered Species Act over 8 years ago, and the Federal proposal does not ensure any improvement for Snake River salmon.

Scientists predict in the course we are currently on that spring chinook in the Snake River system will be extinct by the year 2017.

The Federal proposal reliance on offsite mitigation measures to delay breaching the four Lower Snake River dams also fails to preserve and rebuild salmon runs.

Based on the Federal proposal, we expect to see continuing losses of local salmon populations, particularly in basins of the four or more hydro projects, even in the pristine habitat that is located within Idaho wilderness areas. Even if offsite mitigation measures were appropriate for certain stocks, there is no budget or implementation plan for such measures in the Federal proposal. Other than seeking to have tribal governments further restrict our al-

ready voluntary restricted tribal harvests, the All–H paper describes no role for tribal governments as co-managers in this process.

By its silence, the Federal documents would appear to deny the successes of the tribes in their salmon recovery efforts in basins like the Clearwater, Umatilla, Hood, and Yakima systems.

This is especially frustrating since we held numerous meetings with the Federal Government and our detailed tribal proposals seemed to have made no impact at all.

We also oppose the new concept of full mitigation described in the hydro BIOP. This is a concept based upon the desires of Bonneville and not on either the ESA, the biological needs of salmon, or treaty case law. Under this concept, Bonneville's mitigation responsibilities are capped by estimating the number of fish that would survive if they migrated through a mythical Columbia River that is dam free.

Among other things, the proposal ignores the decades of dam impacts that have eroded the salmon populations.

In conclusion, Mr. Chairman, I would like to say that the alarm on the extinction clock has already gone off long ago. Neither the salmon nor the tribes nor the people of the northwest have time to delay dam breaching of the Lower Snake River dams and implementing the major overhaul the U.S. operation of the hydrosystem needs.

I am deeply disappointed the United States has chosen to ignore its treaty and trust obligations. We will not be deterred from our solemn duties to act on behalf of the salmon and our people.

I would like to end, Mr. Chairman. You know, during the discussions and hearings that were held out in the field, many people have been adding various H's to the All–H paper, and in the hearing at Clarkson, WA, I decided that, on behalf of the Nez Perce Tribe, that I would also add an H to this All–H paper, and H stands for Honor. We expect the United States to honor their treaty commitments to the Indian tribes of this Nation.

What it reminded me of—and I shared this with you previously—was something that Chief Joseph said in 1879. When he was back here in Washington talking to many dignitaries, and the President, as well, he stated at that time in 1879,

> I have heard talk and talk, but nothing is done. Good words do not last long until they amount to something. I'm tired of talk that comes to nothing. It makes my heart sick when I remember all the good words and all the broken promises.

I would just like to conclude with that, Mr. Chairman, and thank you for this opportunity.

Senator CRAPO. Thank you very much, Mr. Penney. Your testimony is always very well prepared and thoughtful, and I appreciate that.

Mr. Boyer, please proceed. We welcome you here to the committee.

STATEMENT OF LIONEL BOYER, CHAIRMAN, SHOSHONE–BANNOCK TRIBES, FORT HALL, ID

Mr. BOYER. Thank you, Chairman Crapo. We thank you for the invitation to make a presentation. We submitted written comments and will be submitting more as we go along as time permits.

My name is Lionel Boyer, chairman of the Fort Hall Business Tribal Council. In the Fort Bridger Treaty of 1868, the bands of Shoshone and Bannock people agreed to have peace with the United States, and then our various bands were removed to the Fort Hall Indian Reservation in southeastern Idaho. However, our treaty preserved our right to hunt, graze, and gather on unoccupied lands of the United States, and salmon are a significant part of our way of life. The salmon is one of the many important resources of our people, as well as the water, the animals, the air, and our Mother Earth. We continue to utilize these resources of the Columbia River Basin since the treaty was signed.

Today the Shoshone-Bannock Tribes are co-managers of these resources within the Columbia River Basin, and we work toward improving the habitat and the survival of the salmon.

The salmon need clean gravel and cool, clear running water to spawn and prepare themselves for their journey to the ocean through a corridor that will not impede their travel. The draft documents fail to honor this natural biological law of the creator for the salmon.

These natural laws of the creator to provide for the continued existence of the natural resources on this Mother Earth have been violated by means of pursuit of progress through man's progress through their divine law of manifest destiny.

The National Marine Fisheries Service is wrong to conclude that the greatest opportunities for survival for the listed Snake River salmon can be accomplished by the National Marine Fisheries Service efforts in the Snake River tributary, because they have already been preserved as natural wilderness areas.

Instead, the National Marine Fisheries Service must concentrate its recovery efforts where man has changed the natural environment the most. Scientific evidence concludes that the migration corridor is the main problem ensuring the extinction of the Snake River listed salmon. The National Marine Fisheries Service cannot change its responsibilities under the 1995 hydrosystem biological opinion that would have identified recovery through a natural river corridor in their 1999 decision.

The conditions in the Pacific Ocean are of concern to all of us. Man's alterations of the environment of this, our Mother Earth, may be having profound effects on the ocean conditions.

The Shoshone-Bannock Tribes applaud the efforts of the National Marine Fisheries Service to reduce harvest impacts over the past 8 years, including harvest in the ocean; however, the National Marine Fisheries Service should not allow any mixed stock harvest of listed fish if those same fish cannot support a harvest in the tributaries.

We can no longer manage for genes and need, instead, to manage for fish. The National Marine Fisheries Service theories on salmon genetics is causing genocide instead of recovery because those theories prevent using abundant, available, and appropriate donor stocks in areas that need fish.

The Shoshone-Bannock Tribes humbly request that the subcommittee assist us in overcoming the National Marine Fisheries Service barriers to the salmon supplementation actions that we have been pursuing for over 10 years.

Of great concern to the Shoshone-Bannock Tribes is the failure of the Federal Caucus to consult with the Shoshone-Bannock Tribes. Despite repeated discussion with Federal Caucus, they failed to recognize our position as equal parties through the Fort Bridger Treaty and *United States* v. *Oregon.*

The Shoshone-Bannock Tribe believes that the listed Snake River salmon and steelhead cannot wait another 8 to 10 years before necessary major improvements and actions are taken to recover these fish.

The Shoshone-Bannock Tribes believe that technological fixes to the Lower Snake River dams will not allow the listed Snake River salmon to survive.

The Shoshone-Bannock Tribes have been saying this longer than any other entity, and thus are learning once again is that we have waited too long to fix the river rather than trying in vain to fix the dams, and we will continue to have to tell you, "We told you so."

What was once the world's largest run of salmon is now the world's greatest and very expensive environmental recovery effort, with no assurance of recovery.

I leave you with the words of an elder. "Only when the last tree has been cut down, only when the last river has been poisoned, only when the last fish has been caught, only then will you learn that money cannot be eaten."

Thank you, Mr. Chairman and the subcommittee, for hosting this hearing and providing us an opportunity to express ourselves.

The Shoshone-Bannock Tribes' technical staff will be providing technical testimony tomorrow.

Senator CRAPO. Thank you very much, Mr. Boyer. We appreciate your testimony, as well.

I think that the people of the region share the strong feelings that you both have represented here about the salmon and the steelhead. My interaction with you and understanding of your positions is one of the reasons that I have added the concept of the spiritual issues to this whole context of the debate that we are having in the Pacific Northwest over how to handle the salmon and the steelhead, and that fits right into the economic and cultural and political issues that are such a difficult but important part of the mix.

This is probably a good point for me to turn to Senator Baucus and see if he wants to make a statement before I begin questions.

Senator Baucus.

Senator BAUCUS. Not at this time.

Senator CRAPO. OK.

Senator BAUCUS. Not yet ready.

Senator CRAPO. All right. Just tell me when you are and we'll make a break for you to do so.

Senator BAUCUS. OK.

Senator CRAPO. Then I will begin with a few questions.

I think the questions I have are really for both of you, so I will ask the question and then see if I can get a response from both of you.

The first is, Mr. Penney and Mr. Boyer, did the Federal Caucus work with you and your fish biologists in preparing the biological opinion or the proposed biological opinion that is now before us?

Mr. PENNEY. Mr. Chairman, as I understand it, as I mentioned in my testimony, the tribe has submitted various comments, almost similar to what Governor Kempthorne had mentioned on the Governors' proposal, that the tribes have submitted numerous documents, and we feel that they have not been fully considered or implemented in this process.

Senator CRAPO. Mr. Boyer.

Mr. BOYER. Mr. Chairman, we feel the same in reference to that. We have submitted very many documents. We have spent much time in travel in attending a lot of these caucus meetings, with no response to our words that we have left with them. It is not written in the opinion.

Senator CRAPO. So does this go beyond—you may be saying that you had collaboration but that your ideas and your beliefs were not represented in the document, and I understand that that is what has taken place, from your testimony. Are you also saying, though, that you didn't really feel that you had the opportunity for collaboration and give-and-take in terms of understanding where it was going and being able to respond as it progressed and developed?

Mr. BOYER. Mr. Chairman, our collaboration, as I said, in many, many cases our words were not listened to, were not put into any documents that would recognize that we have been a part of that collaboration.

I think that the efforts that the tribes—all the tribes, it seems to be fruitless in reference to submitting a lot of these documents, because we never see the end result written into the drafts or the final documents.

Senator CRAPO. Do you ever get an explanation for why it isn't accepted or what the rationale is or what has happened in terms of moving in other directions, or do you just submit documents and then see the final outcome?

Mr. BOYER. Mr. Chairman, the documents—the response that we have from them is, "We overlooked it," or, "We haven't gotten to that." You know, it is very, very concerning to us that our words, our concerns are not considered within these. If they are considered, it is written in a way that is not recognized.

Senator CRAPO. Mr. Penney, did you want to add anything?

Mr. PENNEY. Mr. Chairman, I think your opening comment and I think the words of Governor Kempthorne, as far as the coordination, cooperation, collaboration, and even consultation—you know, the term "consultation" for tribes over the years has been somewhat the hard feeling in tribes across this Nation, and the Nez Perce Tribe, as well. I think there is nothing worse to enter consultations or discussions and seeing that your input may not be fully considered in any final document.

As Mr. Boyer had pointed out, we spent a tremendous amount of time and energy trying to provide our input, but many times it is not seen in the final documents.

Senator CRAPO. Thank you.

Both of you have testified that you believe the ultimate solution must be the breach of the four dams. Am I correct on that—the four dams on the Lower Snake?

Mr. BOYER. Mr. Chairman, yes.

Senator CRAPO. As you know, I have not accepted that position at this point, and there is a lot of political opposition, as well as economic and cultural opposition to that action, which, as I've said earlier, I believe must be taken into consideration by the policymakers.

The question I have is—and maybe I should just elaborate a little further. Mr. Boyer, you stated in your testimony, and I think Mr. Penney would probably agree with this, because his testimony is consistent with it, that as we look at the various areas from the ocean to the habitat and all of the different H's, you indicated you thought the main problem was with the main river channel and the issue of how we get the smolt to the ocean safely and in large numbers.

Am I correct about that, that that's what you perceive to be the main challenge here in terms of finding a solution?

Mr. BOYER. Mr. Chairman, yes.

Senator CRAPO. Would you agree, Mr. Penney?

Mr. PENNEY. I think, Mr. Chairman, that is basically correct.

Senator CRAPO. Then the question I have is, in recognizing that your solution to that would be breaching dams, but also recognizing that there is such political, cultural, economic, and other opposition to breaching dams that it could result in a gridlock that Governor Kempthorne and I discussed during his testimony, do you believe there are steps that can be taken short of breaching dams that will have significant and positive impacts on saving the fish?

Mr. PENNEY. Mr. Chairman, on your last question, I would just like to make one addition.

Senator CRAPO. Sure.

Mr. PENNEY. You know, we're talking about some of the outmigration of juveniles, but also I think the success of recovery is also dependent on the amount of returning adults to the tributaries, and I think that also needs to be taken into consideration.

Senator CRAPO. Would that also focus, though, on fixing the main river channel?

Mr. PENNEY. Well, I think, as described, you know, there are many concerns, and the Nez Perce Tribe certainly respects everyone's opinions that they have.

Senator CRAPO. Yes.

Mr. PENNEY. I think that, based on the All–H paper—I don't know if we can call it an All–H paper any more. It seems to be focusing just on certain areas and delaying the hydro for up to 10 years. But, you know, there are measures that the tribes have proposed over the years, and some of them have to do with—I think one of the barriers for recovery has been the—I don't know if it is the policy or exactly what it is, a rule—I don't believe it is a rule, but even the definition of an ESU—evolutionary significant unit—under the Endangered Species Act I think is part of the reason it is barring recovery. I think that is one aspect that needs to be considered, as well.

Senator CRAPO. Thank you.

Mr. Boyer, are there things short of breaching dams that can be done to address the main river channel?

Mr. BOYER. Mr. Chairman, I think one of the concerns that we have is that the four Lower Snake River dams are a—they are

river-run dams that provide for transportation, but the concern that we have is that those reservoirs behind those dams create a lot of havoc for the fish as they are going to the ocean, primarily because of temperature changes and the flow of the waters are not there to guide and direct those fish to go to the ocean.

In the process, as the Governor has stated, a lot of those fish disappear in the process, and I think the main concern would be the lack of flow plus the change of temperature that does eliminate a lot of those smolts that are going to the ocean.

Senator CRAPO. Mr. Penney, you made a statement that I want to pursue a little bit in your last statement. You said that you weren't sure that the All–H approaches all–H's any more, and that the focus seems to have been moved away from the hydro H to the other H's in the Federal plan that we see developing.

Could you elaborate a little bit on your thoughts there?

Mr. PENNEY. Well, as I understand the document—and I haven't fully reviewed every aspect of it, but I understand that there are check points, I believe 3, 5, and 8 years under the plan, and at any one of those check points, if it appears that under some of the processes that take place to that point, that they are not succeeding, then it sounds like you go back and start over again.

I think, as far as all the H's, that hydro is simply being delayed up to 10 years, and, as I mentioned in my testimony, we are on the brink of extinction at this point, and I think delaying 5, 10 years is going to be very harmful to the fish of the Northwest.

I would also like to make an additional statement just on the other aspects of the Lower Snake River, itself, as far as the Clean Water Act.

You know, we have heard a lot of people talk about the other values of the system as far as recreation and those types of things, and I truly believe, personally, that, under the current path we are on now, that there probably is going to come a point that the streams are going to be so polluted that you are probably not going to be able to recreate in those waters. I am just fearful that there will be some day that you won't even be able to swim in those streams.

Senator CRAPO. Well, you have opened an issue where, although you and I may not agree entirely on it, I do think that you have opened an issue that deserves further investigation, and that is this: one of the concerns that I see, from what I see with the Federal plans development at this point, is that, as you have indicated, there are the four H's that everyone is trying to evaluate in terms of how to address, and we all recognize, I believe, that there is progress that can be made in each of those areas—Harvest, Hatcheries, Hydro, and Habitat. I do not think anybody's plan—the Federal plan or the Governors' proposal or others—I don't think anybody's plan ignores any of the H's entirely, but there are different levels of focus on different parts of each of the H's, so to speak, and one of the issues that I would like to delve into here a little bit is whether the Federal plan is putting the right level of focus on the various opportunities that we have in each of those areas.

You have indicated that you believe that there isn't an adequate focus on the hydro H, I assume because there is not a proposal to breach the dams.

I have a concern that perhaps there isn't enough focus on the hydro H, not because it does not recommend breaching dams, but because of some of the other things that I think we could do in that area that would be beneficial and would give us the best chance to see if we could do something short of breaching dams while we have this opportunity to do so.

In that context, I would ask for both of you to comment. Do you believe that, given your belief that the dams should be breached—and I understand that that is your major objection—do you believe that, setting that aside for just a moment, that there is still not an adequate focus on the hydro part or the main stem part of the river in terms of the Federal plan, Mr. Penney?

Mr. PENNEY. Mr. Chairman, I think one of my concerns—and I am not certain if the position has changed or not, but I think previously the Idaho Fish and Game Department had supported natural river flow scheme, as well as numerous other scientific people, and my concern is that, you know, we have heard mention of scientific information, we hear a lot of discussion that we need the best biological information, and then there comes a question on whose information should we rely on, and I read an article this morning that probably was in the Washington Post that many people believe that, rather than being based on scientific and biological information available, that it is becoming more of a political question than anything else.

That deeply concerns me, but I can assure you that the Nez Perce Tribe is committed to doing what is best on behalf of the resource.

Senator CRAPO. Thank you.

Mr. Boyer, do you have any thoughts?

Mr. BOYER. Mr. Chairman, I agree with what Mr. Penney has stated. One of the things that I would like to say is that the All–H paper, if there was some way that we could put the spirituality of the tribes with the salmon and the natural resources as an H, we may be able to understand what we are talking about.

As it is, as you know, we, as Indian people, do have a very spiritual connection to all of the resources of this Mother Earth, and that has been, as I stated in my statement, has been violated through man's progress and hasn't been considered, even though the tribes, the first people of this country, have made treaties with the United States.

I guess the spirituality, I guess, we could consider as one of the H's, as Mr. Penney stated, honor. Honor those agreements, those treaties. The spirituality connection that we have with all of these resources, and specifically with the salmon, is that that is important to us, and then we, as the Shoshone-Bannock Tribes, we were removed from our natural gathering places and put into an area where there was none. But we continue practicing our spiritual connection with those resources. That hasn't been considered. That's what I'm getting to. That's why I'm saying the natural rivers should be there. That's what the fish need. That's what the country needs. That's what the economy needs. It has to be natural.

Senator CRAPO. Thank you, Mr. Boyer. I think both you and Mr. Penney are very strong advocates for your positions, and your em-

phasis on the spiritual aspect of this has certainly registered with me, and I think that it is registering with the people across the Pacific Northwest because, whether one approaches it from your cultural background or from the cultural background of others, I think there is very little dispute about the fact that the salmon and the steelhead are a part of our heritage. That goes to our very core and that is important for us to make sure that these fish are not allowed to go extinct.

So, although we do have differences, as there are many in the region, I do want you to know that I share that core value that you have just expressed, and hopefully we will be able to find a path forward to solve the problem.

All right. We thank this panel for coming forward, and we excuse you at this time.

Mr. PENNEY. Thank you, Mr. Chairman.

Senator CRAPO. Before I call the next panel forward, I would like to turn to Senator Baucus.

Actually, Senator Baucus, I did not give you a chance for questions.

Senator BAUCUS. That's fine.

Senator CRAPO. If you have questions, you are welcome to ask them.

OPENING STATEMENT OF HON. MAX BAUCUS, U.S. SENATOR FROM THE STATE OF MONTANA

Senator BAUCUS. I appreciate it. Thank you.

Mr. Chairman, I appreciate your holding this hearing. It is very important to ask questions to get to the heart of a lot of the problems surrounding recovery of the salmon.

I would like to make a couple of points with respect to my State of Montana, because often in the Pacific Northwest environmental issues that Montana is not really, I think, fully understood as it could and should be.

First of all, we don't—it is true we don't have a lot of salmon in our State, but I remember not too many years ago I, at the end of September, went up to just out west of Glacier Park and watched the eagles come down to catch the salmon as they were going upstream, and it is quite a sight. It was a wonderful sight to behold. But the salmon aren't there any more.

But we in Montana do have a lot of rivers, and, along with rivers in Canada, form the headwaters of the Columbia River Basin. We also have two reservoirs which are extremely import to us, Kukanoosa and Hungry Horse, which are very integral to any solutions that would help protect the salmon. These reservoirs are important, first, because they provide a lot of recreational opportunities, and then the draw-downs of the reservoirs are significant and fluctuate a lot, it very significantly adversely affects some recreation in our State.

The reservoirs also provide habitat for bull trout, another endangered species or threatened, or at least a species which is in some difficulty, and sometimes protecting the salmon is in conflict with saving the bull trout, but we have to also remember bull trout.

We are also part of the Bonneville system, at least western Montana is part of the Bonneville system. That means anything we do

in the system has to take a hard look at the degree to which it affects power rates, which are clearly important to our electrical co-ops. Western Montana homeowners, small business, and also large business—we have a very large aluminum plant in Columbia Falls, western Montana, that is directly affected by power rates. We rely heavily on timber harvesting, agricultural, and a substantial part of our grain is shipped out of Lewistown down the river.

So we have a lot of interests in this question, and we still clearly want to protect the salmon, but we want to do it in a way that is mindful of interests in our State.

Let me turn briefly to the draft biological opinion. I'm studying it, like everybody else, and I know this hearing is going to help provide more information.

First and foremost, I want to be sure that this issue is kept in the hands of Federal and State officials—that is elected and unelected Federal and State officials and the executive and legislative side—rather than the courts. I don't want these decisions made by the courts. I know that Judge Marsh has overall jurisdiction in this issue and will be looking at the draft biological opinion to see how it is implemented, and it could well be that some group or another might well file an action with Judge Marsh claiming that it is inappropriate, that the draft biological opinion is arbitrary, it's capricious, it there's not a reasonable likelihood that it is going to protect salmon release—to not jeopardize salmon habitat.

So let's make sure that this is bullet proof from the judicial attack. That means all of us are going to have to go the extra mile to make sure that it does withstand a judicial challenge.

Beyond that, we need balance. Recovering the various salmon species, we also need to recover, as I mentioned, bull trout, and impacts on water levels and power rates and affected industries.

I look forward to this hearing. I am particularly pleased that John Etchart is here representing Montana and the Northwest Power Planning Council. John has been around a long time. The main point is John knows his stuff. He has been at it for a good, long time and he is a good advocate. He's thoughtful and he's an expert and he is a straight shooter.

I apologize that I was not here for Senator Kempthorne's statement. Senator Kempthorne, as the chairman of the subcommittee well knows, was a very, very strong member of this committee. We worked long hours late into the night, sleeves rolled up, putting together Endangered Species Act reform. I mean, Senator Kempthorne was firmly dedicated, more than any other Senator, to try to reform the Endangered Species Act. Late nights with Secretary Babbitt in this room, all around tables—we passed something an eyelash of getting passed in the full Senate. For various reasons, it was held up on the floor.

Anyway, I know he is doing a great job in Idaho, a strong advocate for Idaho and for what is right, generally, and I just wish I had been here, Mr. Chairman, to hear his testimony.

Thank you.

Senator CRAPO. Thank you very much.

If you have no questions, we will excuse this panel. We thank you very much, gentlemen, for coming.

We now invite up our third panel: Mr. John Etchart from Helena, MT, on behalf of Governor Racicot; Mr. Eric Bloch from Portland on behalf of Governor Kitzhaber; and Mr. Frank Cassidy from Vancouver on behalf of Governor Locke.

I will again welcome you here. I know that your Governors wish they could have been here in person, and you probably do, too, but we are glad that you are able to make it and share the views of your States on this important issue.

We will start with you, Mr. Etchart.

STATEMENT OF JOHN ETCHART, HELENA, MT, ON BEHALF OF GOVERNOR RACICOT

Mr. ETCHART. Mr. Chairman, thank you very much. Good morning, Senator Baucus. Thank you for the opportunity to testify. As you know by now, my name is John Etchart. I am here on behalf of Governor Racicot of the State of Montana. For the past 7 years, a long time, I have represented the Governor on the Northwest Power Planning Council.

I'd say two things parenthetically. First of all, I speak in strong affirmation of Governor Kempthorne's remarks this morning.

Second, Senator Baucus, thank you very much for your kind remarks.

I want to start by extending Governor Racicot's regrets for being unable to attend today's hearing. If he were here, he would start by telling you of his great faith in the Power Planning Council and commend Congress for having the foresight to create it in the 1980 Northwest Power Act.

Governor Racicot has great confidence in the Council as the institution that will lead the northwest to improved fish and wildlife numbers, as well as a continued supply of adequate and reliable power.

The Governor believes that the Council is an extraordinary experiment in government, and in his view and mine, its operations are an excellent example of States working together to solve mutual problems and achieve common goals. The issues we face are highly complex and success never comes easily. However, there is a tremendous value in the Council as a regional body where States are encouraged to develop larger perspectives beyond their own borders and made to do their work in public and based on science.

If the Council didn't exist today, considering the magnitude of the problems that we have in the Pacific Northwest in managing our resources, I would guess that somebody in this building would be thinking about how to create it or something like it.

If there is a common theme to my remarks today, it is that there continues to be a need for increasing accountability in both the policy and budgetary realms in the decisionmaking of the Columbia Basin. Congress took a very important step in improving accountability in the annual expenditure of Bonneville Fish and Wildlife funds in 1996, when it passed an amendment sponsored by Senator Gorton, an amendment to the Northwest Power Act. This amendment requires that all fish and wildlife projects proposed for funding by Bonneville would have to be reviewed by an independent group of scientists nominated by the National Research Council. This action by Congress has resulted in a noticeable increase in

confidence that the public's money, about $130 million a year, is being spent much more wisely.

It has brought a measure of discipline to the individual project sponsors, many of whom are the State, tribal, and Federal fish and wildlife agencies, to the Power Planning Council, and to Bonneville.

Since the amendment was enacted, there is a much greater appreciation that a continuing pattern of expenditures without results can't be tolerated.

Frankly, Mr. Chairman, in my time as a Council member, the 1996 amendment has done more to bring order to the fish and wildlife recovery process in the Columbia Basin than any other single thing.

There also needs to be a similar degree of accountability in budgeting for ESA activities such as those described in the draft biological opinion that are financed by Bonneville. Unlike the Bonneville funds that pay for fish and wildlife projects that implement the Council's fish and wildlife program, which was subject to the rigorous scientific and public reviews required under the Senate amendment, NMFS's ESA activities funded by Bonneville are done so on a unilateral basis; that is to say, they are not required to be reviewed by anyone, not by Congress, not by our independent scientists, not by the Council, the States, the tribes, or the public.

This shortcoming in the expenditure of Bonneville funds for specific ESA activities can easily be addressed by requiring NMFS to agree to submit its ratepayer-funded ESA proposals for review under the provisions of the Senate amendment.

Additionally, considering the high level of interest in implementation of endangered species activities, Governor Racicot recommends that Congress consider requiring NMFS to submit annually a specific ESA budget to Congress for its review. The budget could include NMFS's proposed expenditures using appropriated dollars, as well as its proposed Bonneville-funded activities that would be submitted to the Council for review under provisions of the 1996 amendment.

This would address the potential conflict of interest that currently exists with a regulatory agency, NMFS, funding its agenda with non-appropriated dollars provided by Bonneville, the agency that it is regulating.

One last area of concern, Mr. Chairman, deals with the Federal agencies' protocol for in-season decisions on the operation of the hydrosystem. One can have serious questions as to whether there is suitable accountability for these operational decisions that can cost into the tens of millions of dollars. For example, just last month these operational decisions in just 1 week resulted in Bonneville having to purchase power in the market at a cost of about $45 million.

While I won't and can't say that this is an inappropriate expenditure, I will say that this decision was made by Federal fish managers, ostensibly to improve in-river conditions for what I understand was a relatively small number of fish.

The primary point I am trying to make here is that decisions with such profound and costly implications should be made on a cooperative basis, in a public forum that seeks the views of all parties

and interests, especially those of the four States, and provides a serious balancing of the costs and benefits of the proposed actions.

Last, Governor Racicot has felt for a long time that the region, just as in your exchange with Governor Kempthorne, Mr. Chairman, should be given greater authority to develop and implement measures to recover fish and wildlife species in the Columbia Basin.

Since the region's electricity ratepayers, not the taxpayers, fund most of the recovery activities in the Columbia, it is appropriate that the region be given a larger role.

Underscoring this perspective is the fact that 20 years ago right now Congress created the Northwest Power Planning Council to ensure that the region did have a larger role in just these issues.

A simple amendment to the Northwest Power Act requiring the Federal agencies to act in a manner consistent with the Council's fish and wildlife program would be a significant and positive step toward this goal.

Thank you, Mr. Chairman.

Senator CRAPO. Thank you, Mr. Etchart.

Mr. Bloch.

STATEMENT OF ERIC BLOCH, PORTLAND, OR, ON BEHALF OF GOVERNOR KITZHABER

Mr. BLOCH. Thank you, Mr. Chairman, Senator Baucus. My name is Eric Bloch, and I am here today representing Oregon's Governor John Kitzhaber. I also represent Oregon on the Northwest Power Planning Council, and I currently serve as the Council's vice chairman.

Thank you for the opportunity to testify today on fish and wildlife recovery efforts in the Pacific Northwest, and specifically on the draft biological opinion issued recently by the National Marine Fisheries Service.

The general approach to recovery articulated in the draft biological opinion is commendable. It reflects one of the important lessons learned over the past decade—that improvements in salmon survival must come through reducing mortality caused by hydrosystem operations and habitat degradation and harvesting and unscientific hatchery practices, all of the so-called "four Hs."

This approach is also reflected in the recommendations for protection of Columbia River Basin fish issued in July by the Governors of Oregon, Idaho, Montana, and Washington.

The Governors' recommendations constitute a substantial commitment toward the goal of ecosystem restoration, while accounting for the importance of maintaining a strong economy in the Pacific Northwest.

The recommendations, while not a scientific recovery plan, embodies the judgment of the four Governors that dam bypass, while a significant issue, was threatening to eclipse the larger debate. What are we prepared to do now to more swiftly and surely achieve a healthy Columbia Basin ecosystem with healthy and harvestable levels of salmon and steelhead?

The Governors believed that the best way to move that larger debate forward was to throw their support behind a suite of actions they believed could and should be done immediately to help fish.

Governor Kitzhaber expects that the Federal agencies will review the Governors recommendations as part of the process of finalizing the draft biological opinion.

As I indicated at the outset, Governor Kitzhaber believes the overall four–H approach outlined in the draft biological opinion is appropriate, but we believe meeting the legal mandated under the Endangered Species Act to ensure both survival and recovery of the listed salmon and steelhead means the biological opinion, as it is finalized, must be strengthened so as to reflect the true extinction risk and the necessary level of survival improvements, both of which we believe are under-estimated in the draft biological opinion.

Thus, Oregon offers the following specific proposals to strengthen the draft biological opinion.

First, the opinion's recovery strategy in each of the four H's must be made more robust by adding on-the-ground actions not included in the Federal document and by increasing the intensity of some of the actions that are included.

Regarding hydropower operations, Governor Kitzhaber believes that the Federal plan appears to rely too heavily on technological fixes and fish barging rather than on improving in-river conditions for fish migration.

I would note that this approach differs from the four Governors' recommendations, which assert stronger support for hydrosystem configurations and operations that more closely resemble natural river processes, recognize fish barging as an interim strategy, and call for additional investments to improve river conditions so that more fish can migrate in-river.

In the area of harvest, we know that we must reduce the level of impacts on threatened and endangered stocks, while still affording reasonable ceremonial, commercial, and sport fishing opportunities.

We can achieve this reduction by lowering the harvest rates, particularly for the fall fisheries that impact Snake River fall chinook, but we should also seek reductions through license buy-backs and use of more selective gear types, and we must create new terminal fishing opportunities off the main stem like the successful terminal fishery at Oregon's Young's Bay.

Regarding habitat, we support the Federal Government channeling its support to the State, tribal, and regional efforts currently underway that will result in improvements to salmon-related habitat. We also support, in the area of habitat, the provision in the biological opinion that calls for creating a mechanism to purchase water and habitat rights on a willing seller/willing buyer basis, as well as more and better assistance to private parties for such things as riparian protection and water conservation.

For hatcheries, the Federal Government must use the biological opinion to marshall its resources and authorities to promote the reforms described in the artificial production review which the Northwest Power Planning Council produced at this Congress' request.

Finally, as all four of the region's Governors clearly stated in their consensus recommendations, the recovery effort we face will be costly. To be credible, the recovery plan outlined in the draft biological opinion must provide a detailed budget and funding strat-

egy. Such a budget and funding strategy should include an increased level of appropriated funds because, after all, recovering listed salmon, improving water quality in the Columbia and Snake Rivers, and honoring treaty rights are national obligations.

We also urge the creation of a new authority for a Columbia-Snake River regional salmon recovery plan, as was done with the Everglades and the salmon recovery effort known as Cal/Fed.

On these funding issues and all other issues, we look forward to working closely with Congress and the Administration to ensure that the opportunity to implement a recovery strategy that does not require bypass of the four Lower Snake dams is not jeopardized by a lack of resources.

Thank you again, Mr. Chairman, for the opportunity to testify.

Senator CRAPO. Thank you, Mr. Bloch.

Mr. Cassidy.

STATEMENT OF FRANK L. CASSIDY, VANCOUVER, WA, ON BEHALF OF GOVERNOR LOCKE

Mr. CASSIDY. Thank you, Mr. Chairman. My name is Frank L. Cassidy, Jr., and I am chairman of the Northwest Power Planning Council. Today I am also representing the Hon. Gary Locke, Governor of the State of Washington, who also apologizes for his inability to attend. He would have liked to have been here.

As you well know, the Power Planning Council is an agency of the States of Idaho, Montana, Oregon, and Washington, and, as you've heard earlier, under the Northwest Power Act of 1980, the Council conducts long-range electrical energy planning and analysis and also prepares a program to protect, mitigate, and enhance fish and wildlife on the Columbia River Basin that have been affected by the hydropower dams.

That program, the Columbia River Basin fish and wildlife program, directs the annual expenditure of about $130 million in electricity rate-payer funds for the benefit of all fish and wildlife, including threatened and endangered species.

Currently, as we speak, we are undertaking a major amendment of that fish and wildlife program. In the future, it will be implemented primarily through locally developed action plans that are consistent with basin-wide goals and objectives and an underlying foundation of scientific principles.

With the Snake River dam breaching off the table for at least 5 years—and that's our view at the Council presently—there will be a strong emphasis on improving spawning and rearing habitat in our new plan. We will try to change hatchery and harvest practices to support rebuilding naturally spawning fish populations and work to improve both smolt and adult fish passage survival throughout the basin, including at the dams.

These are the key elements of the Council's fish and wildlife program now under amendment, and they are also addressed in the fish recovery recommendations issued in July by the Governors of Idaho, Montana, Oregon, and Washington.

I hope the Federal action agencies will carefully review the Governors' recommendation finalizing the draft biological opinions. As you can see, we support Governor Kempthorne's comments about the Governors' document.

Mr. Chairman, you asked for the points that we would have regarding the Federal buy-out. There are important similarities between the Council's program and the Federal program proposed in the draft 2000 biological opinion.

No. 1, both rely heavily on offsite habitat improvements, those located away from the hydrosystem.

No. 2, both call for creating performance standards to guide habitat restoration and for reforming fish production facilities consistent with the recommendations in the Council's 1999 report to Congress on artificial production, the "Hatchery Report."

No. 3, the Federal program endorses selected fishing techniques and terminal fishing opportunities to reduce impacts on listed fish. The Council's program already supports such an effort, and, as Eric alluded, we now, as we speak, are creating salmon fishing opportunities in Young's Bay in Astoria and elsewhere on the lower Columbia.

No. 4, both programs would be implemented, ours and the Federal group, through sub-basin plans, and so there is an opportunity for the Council and the Federal agencies to collaborate in designing them.

Today, I would also like to briefly note four areas where the Council believes that biological opinions need further refinement and are in disagreement with our present fish and wildlife draft plan.

First, the opinions are specific in types of actions that are needed to avoid jeopardy, but they are general in describing where these actions are needed and in defining schedules for accomplishing them. We think the northwest citizenry wants certainty and they want facts on how to get that recovery problem achieved.

Second, the Federal documents call for improving stream flows, actions regarding water quantity, water quality, and fish passage, but again are very short on details.

Third, our staff determined the proposed dam operations in the hydropower biological opinion would boost power generation in November, but seriously reduce it in December and January. These are 2 months when we believe the power system will be stressed and most susceptible to reliability problems, therefore we think that's an issue.

In a related matter, we believe protocol should be established, if they are not already, for Bonneville to decide when and under what conditions water spills required under the biological opinions would be curtailed in order to boost hydropower generation. Obviously, if you increase generation and reduce spills, you can affect the outbound migration of salmon.

Fourth, the biological opinions designate priority sub-basins for actions to assist endangered and threatened species but do not specify how these actions would be funded.

We believe it is important for the Administration to prepare and submit for Congress' consideration a supplemental appropriations request for the fiscal year 2001 for actions that address the reasonable and prudent alternatives proposed in the draft biological opinions.

Finally, Mr. Chairman, we look forward to close collaboration with the Federal agencies as we work to protect and enhance the

fish and wildlife of the Columbia River Basin. This collaboration between the region and the Federal agencies will improve public accountability and scientific credibility for all of our efforts.

I thank you again for the opportunity to speak, and I'm pleased to answer any questions.

Senator CRAPO. Thank you very much.

I thank each of you and want to give credit to your respective Governors for their role in the effort to bring together this, I think, very significant step toward building consensus in the region.

I'd like to start my questions by reading something from the Governors' document. This doesn't have a page. It's on the first page of the introduction, at the bottom paragraph. It says, "We are keenly aware of the extent to which breaching the four Lower Snake dams has become a polarizing and a divisive issue. Regardless of the ultimate fate of the dams, the region must be prepared in the near term to recover salmon and to meet its larger fish and wildlife restoration obligations by acting now in areas of agreement without resort to breaching the four dams of the Lower Snake.

"In order to succeed, the region must have the necessary tools and a clear and comprehensive plan, adequate time, and sufficient funding." Then it goes on to make recommendations in that context.

The reason I read that is because I think that it very clearly sets out the perspective that I think we can use as the platform on which we can build consensus in the region.

The question I have is: given that basis of approaching the issue—which, again, I believe is the correct basis—how does the proposal by the Governors differ from the proposal that we now see in the Federal BIOP that we see developing? I mean, what are the—I know you address this a little bit in your testimony, but give me the core difference. What is it that is different that the Governors are recommending that you don't see in the Federal plan?

Who wants to be first?

Mr. Cassidy.

Mr. CASSIDY. Yes, Mr. Chairman. I think probably the big difference is that the Governors' plan calls for a single person to be put in charge by the Federal Government of the overall management of the Federal Government's actions by what they call the "action agencies," and so all the local agencies—either State, county, irrigation districts, whatever—can go to one place to get the information they want. That seems to be a pending problem we hear about as we go around, at least in my State, about how they get one person that they can be accountable to and one person they get straight answers from, and I think that was a significant change.

Senator CRAPO. OK. Mr. Etchart.

Mr. ETCHART. Mr. Chairman, Senator Baucus, there is an awful lot of compatibility between the Governors' recommendations and the draft BIOP. There are also some important differences.

I think maybe the masthead difference that fits in the conversation I've heard this morning is that the Governors want these matters decided on a collaborative basis. They want the stakeholders in the region, tribes, fish agencies, the States to decide these matters on a partnership kind of basis.

The draft BIOP, by the nature of how the ESA works, is a set of unilateral decisions, to use the absolute term, and I think that is at odds with what I heard you and Governor Kempthorne talking about.

There are also any number of other questions. I mean, what is the budget for this BIOP? Who is going to pay for it? What's the basis for the designation of these priority sub-basins? Does the ESA really, as the BIOP holds, preempt Congress' broader mandate to the region to protect all fish and wildlife? There is the power of the purse question that I cited. There are energy loss implications that the BIOP holds that you wouldn't find in the Governors' recommendations. There is an increase in flows contemplated by the BIOP that the Governors' recommendations doesn't hold, and on and on.

Senator CRAPO. Thank you.

Mr. Bloch.

Mr. BLOCH. Yes, Mr. Chairman. As I indicated in my remarks, I think a significant difference between the biological opinion in its draft form and the Governors' recommendations relates to the way it looks at the hydrosystem, itself.

The Governors are, in their document, expressing a view that, even setting the issue of outright removal of some of these dams aside, there are ways that we can make the hydrosystem more amenable to salmon survival through removal of blockages on the main stem—in other words, exploring opportunities above some of the dams to move fish there. We're moving some of the economically marginal dams on some of the tributaries, which is occurring right now. In Oregon we have Marmut Dam on the Sandy River, a couple of dams in Washington, Condit Dam and potentially Wabatux Dam on the Natchez River are being removed.

These are what you call win/win situations, because the owners of the dam, the people who are involved in local communities are in support of that, and so it is really a view of the hydrosystem and trying to view the main stem not as just a passage corridor that can easily be resolved through perpetual reliance on fish barging, but really viewing it as a habitat and needing to improve the quality of that habitat as a means of improving salmon survival.

Senator CRAPO. Thank you.

I appreciate all of those comments, and each one of them kind of fits with some of the concerns that I have had, and since you all answered the question, let me kind of answer it, myself, and lead to a further discussion.

One of the concerns that I have seen is that, if you take the basic position that we are trying to find a path that will help the region avoid the difficult decision to breach dams, and if we are now faced with what I think is an 8- to 10-year period of time to achieve success in that arena, then how do we most successfully do that?

We've got to focus where the problems are and we've got to have meaningful and aggressive solutions in those problem areas, and it just seems to me that one of the differences in focuses that I'm concerned about, as several of you have mentioned, is that there seems to be an increased focus on the Federal plan on water in terms of quantity, which brings me back to flow augmentation issues, and an increased focus—or a decreased focus, if you will, as Mr. Bloch

has more specifically stated, on the main stem of the river and how we are going to be as successful as we can, not in terms of breaching, but short of breaching to get the fish successfully out to the ocean.

It seems to me that if we were to spend the next 8 or 10 years doing things that don't work, then we are essentially creating a path toward breaching the dam.

If we spend the next 8 to 10 years doing the things that have the most effective chance of working, then we are creating an opportunity to avoid that decision about breaching the dams, and that's——

Senator BAUCUS. Mr. Chairman, I'd ask you your intention. Five bells are ringing.

Senator CRAPO. That means we've got very little time, doesn't it.

Senator BAUCUS. Yes. We've got to make some decisions here.

Senator CRAPO. Would you like to go vote and then come back?

Senator BAUCUS. I would like to ask a couple of questions of Mr. Etchart, then go vote.

Senator CRAPO. All right. I'll interrupt my statement and you may go ahead.

Senator BAUCUS. John, just the Montana perspective, just comment, please on the draft biological opinion.

Mr. ETCHART. Well, Mr. Chairman and Senator Baucus, there are lots of similarities. I think the approach of the National Marine Fisheries Service in many ways is compatible with the right way that we think it ought to be done.

There are these exceptions. I mean, the particular exception that you mentioned this morning, Montana has these two huge reservoirs that contain important biology for the State of Montana. The draft biological opinion contemplates taking more water from those reservoirs. That implicates not only our biology, the bull trout you mentioned; it also affects recreation and, as important, it has implications for our energy supply, something we haven't talked about here this morning, but really deserves at least a passing mention. We've had a summer where we've had power in very short supply, really an emergency situation, both price emergencies and availability emergencies. So it worries us that the draft biological opinion is going to take more Montana water.

Senator BAUCUS. That's a very good point. I have been on the phone just giving it to NMFS on the way they are drawing down water from Kukanoosa and Hungry Horse. I just gave them the dickens, frankly.

Senator CRAPO. Add Idaho water into that.

Senator BAUCUS. Yes. It is a huge problem. I just hope that the NMFS folks out here listening to this will take this very seriously.

Senator CRAPO. Certainly.

As you may have noticed, there have been some bells and buzzers going off. We are going to have to call a short recess here to go vote. I understand we only have one vote, so it shouldn't be long.

I'm going to bring the hearing to a recess and ask your forgiveness for us as we take a break here. We'll try to hurry and vote and get back as quickly as we can.

[Break.]

Senator CRAPO. As each of you answered my question, I, too, have a concern, and that concern relates to whether what I see in the Federal plan indicates a direction that is being taken away from this focus or as strong a focus as we need on the river system, and, in another context—and Senator Baucus' questions were, I think, quite helpful in this regard—a move toward more focus on the use of water in more of a flow augmentation regime, or a regime that focuses on more land management efforts.

Here's where my concern lies. As I was saying, if we don't take this opportunity that we have now in the next 8 to 10 years to make a difference and to either solve the problem or find out that all of the other solutions that we think work are really not going to work—I mean, we're going to find out something if we try all these things. If we don't do what is best, then we'll be sitting here in 8 years debating about whether we could have tried something more on the hydrosystem or something more in these other contexts.

At the same time, if we spend the next 8 years consolidating Federal regulatory control over water in the West, and consolidating Federal regulatory control over land in the West, then we will—and then we see that we haven't breached the dams and a decision is then pushed to breach the dams, what we will have is we will have the worst of all worlds in terms of not actually doing what is needed to save the salmon. We will have lost significant State sovereignty over water. We will have a new water regime in the West that is not in the best interest of the people in the West. We will have significant impacts on land management decisions that will not have solved the problem, and we will be faced with a question of breaching the dams.

That is an outcome that I think would be intolerable.

Now, everybody acknowledges that we have to focus on all four of the H's. I don't dispute that, either. But I do tend to think that the most significant successes we will have will be in the area of the river system, and what that means is, I guess, for scientists and others to help us understand as we then try to answer it from a policy perspective.

But I would like to ask each of you if you would be willing to just comment on the perspective I have just put out. Am I right? Am I wrong? Or are there things that I'm seeing that should be clarified, or whatever? Anybody want to jump in first?

Mr. Cassidy.

Mr. CASSIDY. Sure. Thanks, Mr. Chairman.

I'd really address this issue more based on Washington experience, because that is, of course, where I am from, but I think it is, in my view, applicable to the whole region.

As you say, if breaching is off the table, where then do you go to make the waters of the northwest salmon friendly, because without question if we don't have water we don't have fish. If you have agricultural needs, irrigation commitments—in my State of Washington a majority of the rivers in the Columbia Basin are legally over-appropriated. The legal water rights exceed the flow of the river, should all those people choose to use it. They don't today, and that's fortunate. Of course, the value of the senior water right

versus a junior water right is tantamount to a property right in the view and minds of the people in Washington State.

So if we take breaching off the table, which we, in our plans for the next 5 years, are assuming is going to happen, then where do you go for riparian protection, for zone protection for the streams, for temperature control, for filtration, and for water flow?

That, to me, is where the real significant challenge comes throughout our whole region, as I said, particularly in our State.

We tried to work on water markets in the State of Washington, willing buyer/willing seller. We find that this problem is enormous in size, but probably has to be solved inch by inch because local landowners, particularly in the rural areas of Washington State—as, again, I think is true throughout the region—really don't have much confidence or willingness to work with government, whether it is State or Federal or any other level. They just sort of have a way of life they have been used to, and now all of a sudden this issue is important to them in terms of it is going to have some impacts on how their operation operates.

Certainly the government, whether it is State or Federal, has to be prepared to mitigate in the areas where we do have to make changes, but minimizing those changes and getting those people involved in what we call in Washington a "bottoms-up" basis instead of a top-down approach is what the real challenge is.

That's where I'm worried that this whole system could break down, because once you start getting a bottoms-up approach, which is what we're trying to do in Washington—as you probably know, we put a fish and forest agreement together with the timber industry in Washington State, gave them a 50-year tax break on State taxes in exchange for riparian setback zones and other significant advantages for salmon. We have tried to take that same policy over to the ag industry in eastern Washington, and the dairy industry also in western Washington. We haven't been as successful, simply because it is a different frame of thinking.

We are close to some significant breakthroughs, but it really has to be done an inch at a time. The local people have to be involved and do a bottoms-up basis. That, to me, is the most difficult challenge.

If we end up with the Federal Government superimposing this issue—let's go back and use the spotted owl as an example—I'm very concerned it will not work.

The 8 years you talk about will go by so fast it's not funny. That's hardly two life cycles of the spring chinook.

But when talking about the main stem river, I also would say I can remember in 1976 we were arguing about nitrogen supersaturation in the Snake and Columbia Rivers, and it is still there today at exceeding levels that damage the fish.

We also have, I think, ignored this ocean as sort of a black hole for a long time, and finally that's starting to come into focus. At least in my view as a member of the Council it's starting to come into focus.

Salmon spend 75 to 80 percent of its life in the ocean, and I'm not just talking about interception by Canada or Alaska, but the whole feeding and available nutrients that allow salmon to recover. I think a big part of why we're getting good salmon runs back cur-

rently deals with the fact that the currents have changed and the salmon have been able to survive better.

So this whole life cycle, whether it is at the time they are born or when they go down when they go through the water system in the Columbia or when they are in the ocean all has to be put together, and then I think you have to have a little luck.

But I do think that there are some significant challenges that deal with getting the people aware of what is going on. As you get more public awareness, as you've probably noticed, you also get more biologists that tend to also think they know the best way to run the resource. Trying to manage all that and get it sensible has been very difficult.

But I think when you see the four Governors' document, which represents an effort by, as Governor Kempthorne mentioned, two democrats, two republicans, diverse political views coming together, it is a significant sign that the community in the northwest is ready to do something. They are ready to step up and make this happen, and I think we can.

Senator CRAPO. Good. Mr. Bloch.

Mr. BLOCH. Yes. Thank you, Mr. Chairman.

I am personally very heartened by your approach and belief that what we are lacking here is a focused effort to look at the main stem Columbia, Snake Rivers and do what we can to make those areas more suitable habitats.

This is information that came to us as long ago as 1994 in a report that I believe was commissioned at Congress' request by a group that was then called the Independent Science Group and is now the Independent Science Advisory Board.

They titled their report, "Return to the River," and it was, I assume, a very deliberate naming because what they really called for is creating a more normative river or allowing for a more normative river to evolve, and they recognized that if we can do that, if we can focus our efforts on returning to some of the characteristics of a natural river, we are going to have more success in rebuilding these salmon populations.

Now, my belief is that a lot of the focus on removing the lower dams on the Snake River is born of the belief that if you were to remove those dams you would, at least for a stretch of the Snake River, recreate a more normative river there.

Now, if we are not going to remove dams, there may well be other ways, other things that we can do that will, in whole and part, move toward a more normative river system. I think that's where we need to focus our efforts.

I would call out one for special attention, and that is water quality issues. You discuss flow augmentation, and in my mind that is mostly concerning itself with water quantity issues, but water quality is obviously an important aspect of fish health, as well, and there we find the linking up with the Clean Water Act.

I think we need to do a better job of weaving the Clean Water Act processes and the ESA processes together, and, frankly, do a better job in addressing Clean Water Act issues on the main stem.

Finally, I'd just like to say that we can do all this, but I think the effort, if we do focus on main stem improvements and improving the quality of the main stem as a habitat, I think it is going

to remind us of something that Governor Kitzhabe said when he spoke to the American Fishery Society of Oregon in Eugene last February. What he said was,

> There is no doubt in my mind that we can move ahead with salmon recovery without breaching dams. All I am saying to you today is that we have to stop deluding ourselves into believing that our choices will be easier or cheaper if we just leave the dams alone.

I think what we're going to learn through the course of these hearings—and I thank you for this—is that we can embark on a course of salmon recovery and leave the dams in for now and hopefully for the long term, but we need to recognize that we need to commit the effort and the resources to do that, and that effort and those resources are going to be substantial.

Senator CRAPO. Thank you.

Mr. Etchart.

Mr. ETCHART. I can be very brief, Mr. Chairman.

I agree with your concern that increasing Federal consolidation over water and resources in the West is a specter to be concerned about.

Moreover, in my view this is an approach that won't work for salmon, can't work for salmon for the very reason I think you cited in your initial testimony this morning, that any approach that is going to work is going to have to have political support as well as strong biologic and economic underpinnings.

Let me just comment very briefly on what I heard my friend and colleague Mr. Bloch say. We do want to make the river better. I think the Governors made a point of saying as much. But the basis for improving river conditions—for requiring more spill, for requiring more flow—is a compelling biological case that we're getting gains for those increases.

Senator CRAPO. Thank you.

In your collective answers to the question, a couple of other questions have come to my mind, and the first one was really raised by your comments, Mr. Cassidy, but I think it was implicit in everybody else's response, as well.

Does the decision to take dam breaching off the table for the next 8 to 10 years, or whatever the timeframe is, automatically put us in a posture of having to look at more water quantity issues, more flow augmentation issues?

Mr. ETCHART. Mr. Chairman, while Mr. Cassidy gathers his remarks——

Senator CRAPO. Go ahead.

Mr. ETCHART [continuing]. I'll react to that quickly and briefly.

In my mind, from the State of Montana's perspective, and I think from the four Governors' recommendations, even though I'd better be careful I don't say what I'm going to say too strongly, because I might get quarreled with, but in answer to your question I would say not necessarily.

The Governors say about flow augmentation really a couple of things, and about spill, for that matter—that we want the Federal Government, whose practice it has been to put these measures in place, to tell us, to warrant for us what the biological benefits are and what quality of flow is it that provides these benefits.

I think, if a compelling case can be made for flow augmentation—which at this point there are lots of arguments on both sides, but I would argue there's no need to go further—then we should go further. I don't see the need.

I think, Mr. Chairman, just parenthetically, the Council is about to embark on adopting an amendment to our plan. I don't know whether there's going to be increased flows in our program or not, but I can tell you this: the emphasis is not going to be on the hydrosystem, it is going to be on habitat and hatchery reform and harvest restrictions and doing what we can in the river to make it more passable for migrating salmon, but the idea that it necessarily implies more flow I'd say is very much an open question.

Senator CRAPO. Mr. Cassidy.

Mr. CASSIDY. Mr. Chairman, I would sort of throw a curve ball back at you and say it depends on how you define flow augmentation. I've listened to Carl Dryer's (phonetic) presentation, which is very meaningful when he says he doesn't believe there is credible evidence that flow augmentation, as defined in Idaho's "Sacrifice of Water," is a significant contributor.

On the other hand, in my State we look at flow augmentation as this inch-by-inch battle. As Eric mentioned, we're talking about taking Wabatux Dam out and we pick up 750 CFS in the Yakima system. That's critical.

We have an example in the Umatilla where, I think through Federal funding, we have a recycling project where we pump water out of the Columbia to feed the irrigators in the lower Umatilla, and they gave up water so that we could get in-stream flows in the Umatilla and we have fish back there, first time in 77 years. Well, that's a flow augmentation contribution, but it is sort of an inch-by-inch process.

In the John Day River, which may be the Northwest's best-kept secret—no hatcheries, natural runs, and probably the longest river in the State of Oregon, certainly—we have push-up dams throughout the system and over-appropriation on some extraction.

We're trying to work our way through either by acquiring habitat, acquiring water. I call that a form of flow augmentation, where we're starting to gain on the system, but it is an inch-by-inch battle in those battles.

I think you are more referring to this huge block of water that Idaho and Montana have to deal with, and there is one bottom line you can't ignore: to get these fish back, we've got to make the water salmon friendly, and that does take water. How you get there is a myriad of different ways.

My sense is there is not political support presently for any major sacrifice by Idaho or Montana. I think Montana makes some adjustments for the system now with regard to the integrated rule, curbing the flows that do occur, but it is a real battle, at least in Washington State, just fighting it up through inch by inch.

Senator CRAPO. I think that's a helpful clarification. Thank you.

Mr. Bloch.

Mr. BLOCH. Thank you, Mr. Chairman.

The issue of flow augmentation was addressed in the four Governors' document, and the consensus that was reached among the four Governors on that issue was essentially acquiescence to the

current flow augmentation program, which I don't think any of the Governors felt was likely to go away, at least in the short term, and a call to assure that, with the flow augmentation—and really it is the same standard we ought to apply to all that we do, particularly where it has major impacts—let's make sure that it is grounded in good science and that it is achieving the intended biological benefit.

With respect to flow augmentation, Governor Kitzhaber—in the prepared remarks you'll see this—we do, at this point, believe that there is sufficient scientific basis and benefit to the flow augmentation program. We support flow augmentation being increased in the Columbia through the purchase of some Canadian storage, which the biological opinion looks to Bonneville to move forward with those purchases. We support that.

Frankly, the investigation of that Canadian storage was referenced in the 1995 biological opinion, so if it is available we would certainly support it being purchased.

There's also a possibility of getting some additional water for flow augmentation in the Snake River out of the Wahee Reservoir, where currently there is some dead storage there owing to the vagaries of the pump system there. If we could have some infrastructure changes—and estimates are it would run around $50 million—there would be some additional water that could come out of that reservoir that could be dedicated to the flow augmentation program.

Senator CRAPO. Thank you.

Another question that came to my mind as you were each responding is: the objections to breaching the dams are many, but several of the key economic impacts that would be caused by breaching the dams are the destruction of the transportation system on the river and the elimination of some of the irrigation opportunities that are available in the current situation.

It has always been my opinion that, when we talk about whether to breach dams or not, that what we're really saying is—those who oppose it, in particular, are really saying,

> We do not want to do the damage to the Pacific Northwest economically that would occur from eliminating the transportation system on the river or eliminating the irrigation and the irrigated agriculture that is made possible by that.

Those are two of the key elements, it seems to me. Like I say, I'm not trying to minimize the other concerns, but those seem to be two of the most significant concerns.

In that regard, it would seem to me that, even though, with the current BIOP direction that we see, saying that the decision to breach dams is off the table for a period of time, if we were to insist that the plan that is adopted, whatever it be, focus on the main stem of the river, we are going to have to continue to get reassurances about the transportation system and agriculture.

So the question I have is: going beyond the issue of breaching dams to the issue of impacting transportation on the river and impacting agriculture on the river, are the kinds of things that you've discussed that we can do also consistent with maintaining a transportation system, as we now know it, and with maintaining irrigated agriculture as we now know it in the regions that would be impacted?

Mr. CASSIDY. The irrigation issue—which, of course, as you know, the Snake River and the four dams are in my State, so we focus on this issue very heavily.

Senator CRAPO. Right.

Mr. CASSIDY. The irrigation could continue in a breached fashion. It just would be expensive because you would have a normative river instead of the reservoirs, and the present irrigation extraction would have to be expanded down to lower levels in the canyon as the river went back to normal flow.

Senator CRAPO. What about in the non-breach actions that the four Governors might recommend with regard to the main stem of the river? Would they impact irrigation? Do you know?

Mr. CASSIDY. In the Lower Snake I do not believe so, but I'm not positive.

Mr. BLOCH. It, frankly, depends upon what measure you're talking about. Let me illustrate at least my thinking on this by talking a little bit about draw-down.

The sort of dam removal—the concept of removing dams and drawing down dams sort of becomes synonymous in some people's minds, but at least in my mind it is a different animal.

One of the options for system reconfiguration that we might explore is draw-down. I understand that it has been something that has been on the table, been discussed, even been tried on a test basis. But we continue to feel that it is something that we ought to be examining because it may well prove up that doing draw-down at some project to some level in combination with other actions is going to get us on the path to recovery.

Your question is: if we did something like draw-down, for example, would that be fully consistent with irrigation and transportation? There's really no definitive answer. It might be, it might not be, and that's something that we would have to examine as part of the process of looking at the draw-down.

My understanding is that, for example, there are ways to draw down John Day that would produce some substantial biological benefits that might preclude use of the very deep draft barges that are currently in operation but would not preclude use of some of the shallow draft barges.

So, Mr. Chairman, if your question is, if we draw down John Day, would we continue to do everything as we did today? Maybe not. But would there still be a transportation system intact? I think so. But then there's always the question of whether it is economically cost effective to utilize it once you've done that.

These are issues that warrant further analysis, both in terms of the biological benefits and the economic costs.

I think Governor Kitzhaber's perspective is simply that they ought to be kept on the table, we ought to be examining it, we ought to be looking at our options, because if we do leave the dams in place we think that the long-term recovery of these stocks is going to come by piecing together many different activities, and that's why we want to keep as much on the table and under analysis as we can.

Senator CRAPO. Mr. Etchart.

Mr. ETCHART. Mr. Chairman, notwithstanding what my friend, Mr. Bloch, has said, which I think is true in every regard, I think

in Governor Racicot's contemplation the recommendations we made for the next period wouldn't materially interfere with irrigation or transportation.

Drawing down main stem reservoirs, John Day or whatever, is almost as contentious and almost as unsettled from a scientific basis as dam breaching. We don't have that in our contemplation in the short term.

Another thing is that that—we haven't said the word "power" again in this——

Senator CRAPO. I was going to go to that next. Go ahead.

Mr. ETCHART. That measure would have power implications. In the Lower Snakes, people trivialize the contribution the Lower Snakes make. I think you've got people here that are much more—Ms. Johansen is here from BPA. People are here that are much more qualified than me to talk about it. But they make a real contribution, and an even larger contribution to our transmission system, reliability and so on. That's another factor to be thought about here.

Senator CRAPO. Well, I definitely—in fact, as soon as I asked the question I realized I left out perhaps the biggie, and that's power. But if you add power into transportation and irrigation, then I think you've pretty well got the core economic impacts that we maybe were talking about.

Mr. BLOCH. Mr. Chairman, I just wanted to make clear, lest I be misinterpreted, I was not in my comments advocating——

Senator CRAPO. Certainly.

Mr. BLOCH [continuing]. Moving forward with any of these measures; simply that they ought to continue to be examined and part of things we might look at in order to piece together our future recovery efforts.

Senator CRAPO. I assumed that all four of the Governors are committed to a consensus-based approach, and so you'd have to evaluate the likelihood of something that is as contentious as dam breaching, developing that kind of support.

Well, as usual, I could go on forever, but I have another panel that I need to get up here, so I would like to thank you for your attendance and encourage you to continue providing this kind of excellent input.

Thank you.

We'll call up our next panel now: Mr. William Stelle, the northwest regional administrator, for a while, at least, of the National Marine Fisheries Service; Colonel Eric Mogren, Army Corps of Engineers from Portland; Ms. Judith Johansen, administrator of the BPA; and Mr. David Cottingham, the special assistant to the director of the Fish and Wildlife Service.

We thank you all for your time here and your patience. Without anything further, let me go in that order and have you present your testimony, and then we'll get into a discussion.

Thank you. Mr. Stelle.

STATEMENT OF WILLIAM STELLE, NORTHWEST REGION REGIONAL ADMINISTRATOR, NATIONAL MARINE FISHERIES SERVICE, SEATTLE, WA

Mr. STELLE. Senator Crapo, thank you. It is a pleasure to be before this subcommittee again, and I want to thank you and it for its attention to this significant subject.

Mr. Chairman, the National Marine Fisheries Service is engaged in two efforts at present to address salmon recovery policy as it applies to the Federal Columbia River hydropower system. One is a new draft biological opinion covering the operations and configuration of that system under the Endangered Species Act. The other is a basin-wide recovery strategy which we intend as a conceptual recovery plan for all of the listed salmon stocks in the Columbia and Snake Basin.

These two documents, the draft biological opinion and the basin-wide recovery plan, are intended to provide an overall framework for the rebuilding of all of the Snake and steelhead stocks in the Columbia Basin.

First, a note on stock status, itself.

The prognosis for these stocks, as a whole, remains dire. They are in bad shape. Some of them are in very bad shape. The trends are not good.

The basic story, stocks throughout the Columbia Basin remain in trouble, with the upper Columbia chinook, Snake River chinook, and steelhead stocks throughout the basin most at risk.

Yes, we have encouraging returns this year in the basin that are very significant, and yes it looks like we've got some good early jack counts for next year's returns, as well, so it looks to us that significantly ocean conditions may have turned around and may have turned around for the next period of time. If so, that's great news and it is good for the stocks, but it is not a reason to be complacent. One year and two years does not a trend make.

What we are looking for, what we are endeavoring to build is a long-term trend to recovery.

The scope of the new draft biological opinion addresses all 12 evolutionarily significant units, ESUs, within the Columbia Basin. It is an important point because the 1995 biological opinion was focused on the four salmon populations in the Snake, alone.

It addresses operation of the security, including flow and spill.

It addresses system configuration issues, including dam drawdown, passage improvements at each project, and operation of the transportation system through the entirety of the fish migration season.

It proposes performance standards for the hydrosystem, itself, based upon survivals and productivity improvements needed by each of the salmon populations to avoid extinction and achieve a recovery trajectory.

The National Marine Fisheries Service and the action agencies and Fish and Wildlife and EPA have been working together in an inter-agency group since the fall of 1999, and I would say that the level of effort there, Mr. Chairman, has been very significant. A heck of a lot of time and effort by many, many people have been invested in this effort.

The group is composed of senior staff from each agency, and on the beginning of this year, in January of this year, we sent a letter to each of the Northwest States and the 13 Native American tribes inviting them to participate in this process with us. Since then, the work group has been meeting regularly, both by itself and with the States and tribes to lay the groundwork for and develop the key elements of this new draft biological opinion.

Draft materials developed through the Federal work group process have been shared with these States and tribes, including hydrologic and biological analyses of the effects of different flow and spill alternatives, an analysis of the potential effects of those same operational alternatives on the transmission system, and initial description of the information being developed to assist in the evaluation and use of performance standards.

The basin-wide recovery strategy is intended to both capture the details of the hydropower system proposals and envelop them in a broader, more comprehensive strategy involving all the four H's, and it reflects our belief that, in order to be successful, a strategy must be comprehensive and cannot be limited to hydropower issues, alone.

The strategy, therefore, recommends a comprehensive basin-wide program that places a premium on actions that can be implemented quickly, that are likely to provide solid and predictable results, and that will benefit the broadest range of species.

These include conservation hatchery interventions for the weakest stocks, production hatchery reforms across the board in conjunction with the Power Planning Council, improvements on Federal lands, in-stream flows for dewatered streams, elimination of impediments to fish passage in the tributaries, continued improvements to passage at the main stem dams, and rebuilding productivity of the estuary.

The strategy is built on biological considerations, but also recognizes that there is a limit to the resources available for the job and to the authority, Federal agencies.

It emphasizes Federal support for actions that State and local governments are planning or are already undertaking, such as the Northwest Power Planning Council's sub-basin planning proposal, which we strongly endorse and have worked closely with the Council upon.

In the habitat area, where some actions can take decades to show benefits, the program emphasizes those measures that can be taken quickly, with longer-term actions to be taken later based upon the sub-basin assessments through the Council mentioned above.

It also seeks to establish very strong durable connections between the new habitat features of the Council's program and related State programs in the same subject area such as water quality protections, in-stream flows, and riparian-related activities.

Mr. Chairman, I will close my comments with offering a couple of observations on the next steps.

First, the Federal agencies intend to complete this effort by the end of the year, and we are organizing to do so. That entails the completion and promulgation of a final biological opinion and also

continued revisions to the basin-wide strategy as ideas continue to evolve.

Second, we do expect that—I would emphasize that the basin-wide strategy and the draft BIOP are draft documents, and we expect that they should be changed and they will be changed. They are not perfect, as I'm sure comes as no surprise to you, a veteran of this subject. But we do believe that they have laid out the basic framework of the basic course, and we don't expect serious fundamental changes in that course between now and final.

Third—and this is very important, from our perspective—we are open and anxious to continue discussions with the 13 Columbia River tribes and with the four States to flesh out the details, to color in the blanks of the program as they now stand. We believe that there are substantial opportunities to do so, and that, in fact, the area of overlap between the framework that we have laid out and that of the Governors is significant.

The opportunity is there for the Northwest to come to terms on an agreement, a program that we can put into place and implement over the next 5 to 10 years. It is there for us if we choose to take it, and I believe, in good faith, that Federal agencies, States, and tribes, if we work very hard, we can capture that agreement by the end of the year and get on with the business of salmon recovery.

We expect it will require more money—more money at several different levels. We will be at that time prepared to describe what additional funding may be required and additional authorities, Federal authorities, may be required; hence, successful implementation of this program, Senator, will absolutely require the support, active support, of this Congress, as well.

Finally, let us choose to come together on this framework, on this agreement. The alternative is divisiveness and increased litigation next year, which I think is an absolutely unacceptable outcome for the Pacific Northwest, as a whole.

We have the opportunity to do the right thing, and we believe it is time to seize that opportunity.

I thank you and I look forward to your questions, sir.

Senator CRAPO. Thank you.

Colonel Mogren.

STATEMENT OF COLONEL ERIC MOGREN, NORTHWESTERN DIVISION, ARMY CORPS OF ENGINEERS, PORTLAND, OR; ACCOMPANIED BY DOUG ARNDT

Colonel MOGREN. Thank you, Mr. Chairman. I'm Colonel Eric Mogren, deputy division engineer of the Northwestern Division, Army Corps of Engineers, and I thank you for this opportunity to discuss the status of the National Marine Fisheries Service and Fish and Wildlife Service biological opinions on operations of the Federal Columbia River power system.

I'll keep my remarks short, with additional details submitted in written remarks for the record.

As Will mentioned, the overall stocks are in trouble throughout the basin. But he also noted that we are seeing record returns of adult salmon in the Columbia this year. We believe these results are at least partially due to prior investments and the many im-

provements made in the hydropower system to date, as well as the efforts throughout the basin by tribes, States, and local communities. This represents a huge investment at multiple levels, and I would suggest we need not be shy about recognizing that we have seen some return on that investment.

Many of these actions were called for in the biological opinions under which we are currently operating.

In the remainder of my remarks I'd like to focus on four key points.

First, is the relationship of the Snake River EIS to the biological opinions.

Second, is the funding implications of the biological opinions.

Third, the results of a recently released General Accounting Office report on the Snake River EIS.

Fourth, a proposed flood control study that is called for in the BIOP.

With regard to the relationship between the biological opinions and the EIS, the NMFS draft biological opinion reflects the administration intent to pursue aggressive actions across all H's, with specified performance standards and periodic check-ins.

If these efforts fail to show sufficient progress toward restoration, then other measures, such as dam breaching, may be considered. The question of whether to breach the four Lower Snake dams has been a focus in regional discussions on salmon recovery, even though such an action would have influence on only 4 of the 12 listed salmon and steelhead stocks in the basin.

The Corps' Lower Snake River study includes evaluation of dam breach, as well as three other major alternatives for the four Lower Snake dams. These are to maintain the existing system, to maximize transportation of juvenile fish, and make major system improvements such as surface bypass.

The obvious question is whether the measures of the biological opinion predetermine the findings of the EIS. I want to emphasize that both the biological opinion and the EIS depend on the same underlying science. However, under NEPA, the Corps is required to consider all relevant factors, including comments received during the comment period, before selecting a final recommendation.

We are now processing the nearly 200,000 comments that have been received during the public comment period and analyzing the substantive issues raised. We expect to have a final environmental impact statement in March of next year.

On the issue of funding, full implementation of the measures called for in the BIOPs will be an ambitious program requiring substantial increases in appropriations. For example, the President's fiscal year 2001 budget, as submitted to Congress, calls for $91 million in the Corps fish mitigation project. Additional money may be needed to implement the measures in the draft BIOPs that were not foreseen when the original budget was prepared.

With regard to the concerns raised in the General Accounting Office review of the Lower Snake study, the Corps believes that the GAO report substantially validated our EIS process within the scope of the areas that were audited. We are particularly satisfied with their support of the power analysis, which is a substantial component of the overall economic analysis.

GAO did, however, raise two areas of concern which we are now addressing. The first is air quality, which also was raised by EPA. We are working the air quality and water quality issues with EPA to address these technical concerns.

The other is the transportation analysis. We are contracting for further economic review and to respond to the issues raised by the GAO through the Independent Economic Analysis Board.

Finally, I would like to address the issue of the flood control study called for in the draft BIOP. NMFS continues to look for additional flow augmentation to provide flows to assist juvenile salmon migration. The draft BIOP requests a detailed, system-wide, multi-year flood control study to determine if we can provide additional fish flows by reducing the amount of flood control storage.

This would be a major undertaking. If included in the final biological opinion, we would first seek appropriate congressional approval. Further, we would caution that such a study would include a flood damage risk analysis and may lead to the need for increases in flood control protection, and thereby reduce available flow augmentation for fish.

A few final thoughts.

The NMFS biological opinion also calls upon the Corps, the Bureau of Reclamation, and the Bonneville Power Administration to address actions in harvest, hatchery, and habitat for fish restoration as a means of supplementing hydropower operations. For example, we are asked to step up efforts in habitat restoration in tributaries, mainstem reaches, and in the Columbia River estuary. The Corps supports this as part of the All–H approach to fish recovery.

We look to the Congress for continued support of these efforts. We will continue to work with you and keep the lines of communication open.

Mr. Chairman, this concludes my testimony. I would be happy to answer whatever questions you may have.

Senator CRAPO. Thank you, Colonel.

Ms. Johansen.

STATEMENT OF JUDITH JOHANSEN, ADMINISTRATOR, BONNEVILLE POWER ADMINISTRATION, DEPARTMENT OF ENERGY, PORTLAND, OR

Ms. JOHANSEN. Thank you, Mr. Chairman.

I appreciate the opportunity to address you and the subcommittee today, and I applaud your interest and your leadership on the recovery of the Columbia Basin salmon and steelhead runs.

Mr. Chairman, we all want a comprehensive, integrated plan for fish recovery. We have heard that in the region, we've heard that today in your hearing. We need a comprehensive, integrated plan that can be implemented, and I believe we are getting closer to such a plan.

I, personally, am encouraged to see the recent recommendations of the four Northwest Governors and to receive the comments of the tribes during this process. I look forward to the Power Planning Council's rulemaking, which is due out this fall, and I see a lot of convergence in those areas. The onus now obviously is on the Fed-

eral agencies and the region to work together, as you have indicated, in a collaborative way.

I certainly concur with your remarks that we must have the support of the people in the region in order to come up with an implementable plan.

As we have said before and as Bonneville has indicated in terms of its goals, the plan must be scientifically sound; it must comply with our statutory treaty and trust obligations; and it must have broad regional support. But, moreover, it needs to address the many issues that we face in the Columbia Basin. It needs to address all the listed stocks and all four "H's" that affect them. If we can do that, then I think we will be able to achieve, as a region working together, Bonneville's twin goals of recovering the fish and creating the certainty necessary for our region to continue to have a strong economy.

Let me just make three brief points about certain aspects of this discussion that are important to Bonneville, and perhaps of interest to you.

First of all, for the first time in the Endangered Species Act debate we are finally seeing some performance standards. While they may not be perfectly defined in the current iteration of the draft biological opinion, I am quite heartened that we, as a region, are moving toward specific performance standards, and I think that's the very type of issue that we collaboratively need to focus on in the next several months. So the performance standards are a good approach, and I believe we need to keep working on those.

Second, with regard to funding, there is no question that Bonneville will be a significant contributor on behalf of Northwest ratepayers to the funding of this plan. I want to state clearly that Bonneville stands ready to finance its fair share of this plan and the rate-payers' portion of that plan, as we've set forth in our power rate case.

Finally, as has been reiterated throughout my comments, it is obvious to me and to the other Federal agencies that we need to step up the effort to collaborate with the region, including working with the delegation, the States, and the tribes to make sure that we address the issues of substance and science that are key to the underpinnings of a regional plan that meets the criteria that you and Governor Kempthorne and others have talked about today a plan that is scientifically sound, meets the legal requirements, and is, above all, implementable.

Thank you very much for inviting me today. I look forward to your questions.

Senator CRAPO. Thank you.

Mr. Cottingham.

STATEMENT OF DAVID COTTINGHAM, SPECIAL ASSISTANT TO THE DIRECTOR, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR; ACCOMPANIED BY HOWARD SHALLER, VANCOUVER, WA OFFICE, FISH AND WILDLIFE SERVICE

Mr. COTTINGHAM. Thank you, Mr. Chairman. I appreciate the opportunity to be here today.

With me is Dr. Howard Shaller from the Fish and Wildlife Service's Vancouver, WA office should we get into any detailed questions that we might need him to approach. Thank you.

The Service has been working with the action agencies and National Marine Fisheries Service on the consultations, and we are looking primarily at the consultations as regard to sturgeon, Kootenai River sturgeon, which is an endangered species, and threatened bull trout, which are in the upper reaches of the basin, as you know.

We have been focusing on ways to make sure that the salmon plans and the biological opinions that National Marine Fisheries Service is doing and the operations of the FCRPS throughout the Columbia Basin are consistent, and that we minimize the impacts on those species.

Our draft opinion requests adjustments to the operations and ramping rates of Hungry Horse, Libby, and Albeni Falls, and we are asking the Corps to continue looking at studies of pool elevations at Albeni Falls for Kootenai sturgeon spawning.

The draft opinion calls for actions at Libby to allow increased flows and achieve flow objectives, while meeting the dissolved gas problems there.

I would be remiss, sir, given the dialog that you had with the Governor this morning, if I did not mention caspian terns. We recognize the problem. We are working with our colleagues in the agencies to do something about it. We're doing a status review of terns and preparing sea bird management plans. The agencies have adopted a goal to eliminate tern nesting on Rice Island in 2001, but we need to do that by establishing some more appropriate nesting sites throughout the Columbia estuary.

I know that we have some report language in the appropriations bill, and we will be getting some reports to you and the rest of Congress in late March of this year.

With that, sir, I'll conclude my comments and thank you for holding the hearing and allowing us to testify.

Senator CRAPO. Thank you very much.

As Mr. Cottingham indicated, we had asked each of you to bring a technical staffer with you, just in case we needed to have some questions answered, and I understand you have each done so.

I will tell your staffers that they are welcome to pull a chair up with you or be close at hand, just in case they need to pitch in. Maybe we won't even get into any questions they will be needed on.

Mr. Stelle, I think I will start out with you. Does that surprise you? How many more days have you got?

Mr. STELLE. I don't know, but I may move up the schedule.

Senator CRAPO. You've heard some of the concerns that I have already raised in terms of comments and questions that I have discussed with other panelists. One of the concerns that I have—and I think what I'll do is just kind of lay out for you my perspective on what I see has happened and then ask you to comment on it. I've already indicated that I have perceived a lack of collaboration with the States and the tribes and other interested parties and groups in the region. You've testified that, beginning in the fall of

1999, a very intensive effort was undertaken to try to communicate and work with these groups.

I'm not sure that what is being done is what I call collaboration, but I want to go back even further, because it seems to me that before that time, prior to 1998, the path model seemed to be what was the model being utilized, or at least the focus of a lot of the analysis, and sometime in around 1998, as I see it—well, for lack of a better description, I think the Federal Caucus basically just went underground. I'm giving you my perspective on this. We didn't know where things were headed. We couldn't get information. When I say "we," I'm talking about me, but I think that I'm also reflecting input that I've gotten from the States and the tribes and other fisheries managers who didn't know where things were going, and the Federal Caucus basically said, "We're going to go in our own council and come up with something and we'll let you know when we do."

I know that that isn't the exact words that were used, but that's what I perceived happened.

Then, in about the fall of 1999, about a year-and-a-half later, the Federal Caucus surfaced with its proposal, and at that point the CRI model seemed to be the more-favored model, or at least the direction proposed by CRI seemed to be the new way, and a lot of different conclusions have been reached or proposals made, and so forth, based on that apparent new direction.

I'm not here to debate the two models or anything like that. I'm just kind of giving you my perspective of what I've seen happen.

It does seem to me, though, that the new direction taken by the Federal Caucus has been basically one that significantly turned its focus away from the main stem of the river, not that it ignores it, because I realize you've got All H's in your proposal, but the focus on the main stem seems to have been significantly reduced and the focus on things like water quantity or water augmentation, habitat, and hatcheries, and so forth seems to have been increased.

Now, whether that's a result of the CRI model gaining more dominance than the path model or not, I don't know, but that seems to be the new direction taken.

The concern that I see from that—and now a supposed collaborative effort is being undertaken, but, as you probably know from my previous comments on this, I don't deem collaboration to be telling everybody, "This is where we're headed. Now you can comment on it, and then we'll tell you what we think of your comments."

You know, I think collaboration is when you truly bring the parties that are going to be involved in your collaboration to the table and they have a meaningful part of the decisionmaking that has to take place.

When you say you are going to try to finish this by the end of this year, that tells me that you basically are going to have to have some meetings and then make some decisions and get things done in about 3 or 4 months, and I don't see how a collaborative process can even work now in that timeframe. That's one of the reasons I have been objecting so strongly for the last couple of years—that I don't see this happening, and until it happens I don't see success coming.

So my concern is with what I perceive as a lack of collaboration to this point, and now an apparent diversion of the focus of where we think the real benefits in recovery efforts can be achieved.

I'm concerned that we may take this opportunity that we have with the next period of time to try to do something short of breaching and squander the opportunity because we haven't built consensus, we've diverted into what I think are potentially the wrong areas of focus, and we are now facing a very critical timeframe of decisionmaking in which we've got to start doing things that we believe will work and that people in the region believe will work or we are going to be faced with these kinds of dilemmas in just a few years down the road.

I'm sure that you don't entirely agree with my perspective there, or my description of it, but I would just like you to comment on or respond to that perspective.

Mr. STELLE. Thank you, Senator.

Those are thoughtful observations. Let me try to respond in a helpful way.

I think that your basic point about the lack of adequate collaborative effort has merit, and I don't think that neither NMFS nor the other Federal agencies shy from that point.

I think we are open to try to explore better ways to work with our partners in this salmon recovery effort, our essential partners, because they are essential, and develop methods by which we can do so successfully.

What I mean by—"successfully" is a loaded term, or a big term. We need to be able to make decisions. We need to be able to make them based on credible scientific foundation. We need to be able to defend those decisions, because we will be sued, and we should be called upon to defend them. We need to be able to implement them in a timely way. We need to be able to do that in a way that maximizes the opportunity for agreement with the essential parties here for salmon recovery in the Columbia Basin.

I don't think we have any—and I defer in part to my colleagues here. I don't think we have any magic machinery that we can turn to that will be instant success. All you need to do is just add water.

Senator CRAPO. Bad example, but I understand your point.

Mr. STELLE. Add water and stir.

But I think what you see is not a reluctance to try. I think we have a very genuine desire to try and to succeed, and if you have thoughts on how to do it successfully, as the Governors or the tribes, we would welcome that.

But, again, I do have to emphasize the practical end of it, too, which is to say the imperative of being able to make decisions and do things in a timely way because that is our responsibility, as well.

On the change of focus which you have pressed upon, I think you are correct that there is a change of focus. I would describe it a little bit differently, though, Senator.

Senator CRAPO. Please do.

Mr. STELLE. It is not turning away from the hydropower corridor or the hydropower issue; it is building beyond them. So, as I think of it and believe it, we continue to tackle the hydropower issues, both Federal and non-Federal, head on, and we continue to propose

and explore in this new biological opinion for the Federal hydropower system opportunities to improve survivals and improve knowledge.

If we are missing something, we do not intend to miss something, and therefore that is why we welcome the comments from the States and the tribes to see if, in fact, there are things we should be doing through the hydropower corridor that we have not proposed and that we will, therefore, propose.

But yes, we seek to go beyond it, and our view is not a hydrocentric view. That is grounded on the fact that the salmonid life cycle is complex, as you well know; that the risks to salmon recovery occur at each stage of that life cycle; and to be successful in salmon recovery we must be comprehensive.

It is also premised on the belief that, given the hydropower system, Federal hydropower system as it is currently constructed, that the opportunities for substantial, significant survival improvements in the hydropower system, itself, are growing more limited, and that, therefore, if we are seeking very substantial improvements in survivals, we must go elsewhere.

We believe that the opportunities—the most efficient opportunities with the biggest bang for the buck steer us, one, to the estuary, rebuilding the productivity of the estuary, because all of the salmonid populations to varying degrees use is—live there, grow there, beef up before they go to their ocean journey—and in tributaries because the arithmetic of survival opportunities in the tributaries is huge.

So, sir, we have very intentionally tried to broaden the lens on our camera, to broaden the focus, and to develop a recovery strategy that has firm commitments in the four H's so that next spring, when we're standing before a Federal court, we can say, "Your Honor, this is what we were doing in the hydropower corridor. This is the strategy that we're pursuing elsewhere. Here is how it all adds up. Here's the big picture."

Senator CRAPO. I understand what you're saying, but, as I compare, for example, the Governors' paper with the proposed BIOP and what we've seen so far, I see very distinct differences in terms of the approach to the hydropower or the main stem issues, and in that context it just seems to me that NMFS is shifting the focus away from the hydrosystem as a major source of mortality and is putting the focus more on these other areas that you've just described—estuary and tributary habitat.

But it is my understanding that survival from egg to smolt has not declined appreciably since the Snake River salmon populations were robust in the 1960's and survival from smolt to adult has declined substantially over the same period of time.

Given that fact, I don't think that we can effectively conclude that, by shifting our focus into those areas where we already have less of a problem is going to give us better results, and that's the concern that I am raising.

Mr. STELLE. A couple of comments, if I may, Senator.

No. 1, I'm not sure why—we do not necessarily see the significant different approach as do you and the Governors strategy as it relates to the hydropower system. In fact, to the contrary, to be honest. I think we perceive a very significant overlap, and because

of that overlap a huge opportunity for us and the States to come together.

Senator CRAPO. That is encouraging.

Mr. STELLE. As it relates to hydropower, itself, again, I think we see substantial overlap to the strategies. If there are things that the Governors believe we should be doing in the hydropower corridor that we have not proposed to do, then we are all ears.

Senator CRAPO. Would anybody else on the panel like to jump into this discussion, or are you going to use prudence?

[Laughter.]

[No response.]

Senator CRAPO. OK. I gave you your chance.

Well, let me just pursue the question of collaboration a little bit better. What is your contemplation of what needs to take place between now and the end of the year with regard to finalizing this biological opinion? What collaboration is going to take place?

Mr. STELLE. Assuming that the other essential parties are prepared to put their shoulders to the task, as are we—and I do——

Senator CRAPO. Yes. I agree that they will.

Mr. STELLE [continuing]. I believe that we need to engage now, and I mean now, this fall, in a series of discussions with the States, individually and collectively, and the treaty tribes individually and collectively at both a policy and a technical level, one, to ensure that we understand each other at the technical level, and understand the technical and scientific foundations for the views that may be espoused or the recommendations that may be proffered, and then, at the policy level, we have an opportunity thus educated to explore the terms of agreements or explore the disagreements that may be outstanding with the State governments and the tribes.

This will require a substantial effort, and I think that the Federal Caucus is prepared to mount that effort. We see there is no choice but to do so.

At the end of the day, we believe that there are Federal laws that will require Federal agencies to make decisions, and we are prepared to do so, but we absolutely want to ground those decisions on agreements with the States and the tribes to the maximum extent possible.

Senator CRAPO. Does that involve—well, let me preface this. It seems to me, notwithstanding what you've said today, it seems to me from the input that I've received—and I have been working on this, as you know, about constantly, but it seems to me like the input that I received from tribal and State fisheries managers is that there is a significant disagreement between their approach to the science and what they now see gaining dominance in the Federal Caucus' proposed BIOP.

Now, perhaps that disagreement isn't as broad as I believe it is, and I'm not going to try to resolve that issue here today, but it seems to me that one way to make certain of that is to bring together those fishery scientists and people, especially in the short term that we have facing us on a rather rapid basis, and get those people back together so that there can be the kinds of interaction between the various decisionmakers that needs to take place for collaboration to truly work.

Are you prepared to commit to that?

Mr. STELLE. Yes, Senator, I am. May I offer a couple of observations——

Senator CRAPO. Yes.

Mr. STELLE [continuing]. That I hope are helpful to you?

Senator CRAPO. Certainly.

Mr. STELLE. First of all, please understand that the development of the quantitative modeling work by the National Marine Fisheries Service, which is known in shorthand as CRI, was not intended to and is not a tool that is exclusive to the Columbia Basin, and I have pressed very hard over the last 4 to 5 years on our science center to develop those better quantitative data base pools by which to project, be able to project outcomes so that we could use that across the board in the West in helping the agency make decisions about what works, what may work, and what may not work.

So the CRI—developing that toolbox that would be commonly called the CRI, is not simply a tool for the Columbia Basin at all, it will be deployed in decisionmaking on Puget Sound, and coastwide, I hope.

Having said that, I think that your observation or criticism about the CRI being perceived or the NMFS science work being perceived by others in the region as isolated, not collaborative, or done in relative isolation and not sufficiently collaborative, I think there are elements of truth in that observation, and the struggle for us—and it is a struggle—is to develop the methods by which we undertake analyses that we believe are absolutely credible from a science perspective and that can stand the legitimate test of peer review, because that, at the end of the day, is the touchstone of our decisionmaking as a matter of law and as a matter of common sense.

How do we maintain the integrity of that scientific process and at the same time open the doors to it so that others have the opportunity to critique it, to participate in it, and to help us improve it?

It is not a consensus-based exercise. Something is not right from a scientific perspective because everybody agrees. Something is right, do it. Something is right from a scientific perspective because it measures up through the scientific process.

Senator CRAPO. But in a lot of models——

Mr. STELLE. The challenge for us, Senator, is to pull those two things together. Have we done that well enough? No. Are there opportunities to continue to improve that? Yes.

I would also encourage your focus not only on this issue—this issue is not only an issue between now and December.

Senator CRAPO. Right.

Mr. STELLE. Now and whenever we complete this planning. This is really an implementation measure as much if not more than simply a planning measure because the program that we are laying out here is a longer-term program, it places a very heavy emphasis on escalating our efforts in monitoring and research into those areas of the unknown that we need to know more about. The implementation of that monitoring and the research work is going to be crucial to the success of the program.

How do we do that so that it builds the confidence of the region that it is well-grounded? How do we do that so that we avoid those

scientific squabbles that we should be able to avoid? It is an absolutely fair question.

Senator CRAPO. It is a very tough one to answer, but it seems to me that—and I agree you don't find good science by consensus, you find good science by doing the scientific process well and getting the answers objectively verified. But it seems to me that as we, in this area as well as many others, work with models, a lot of the outcome of the models depends on the assumptions on which the models are operated, and I don't believe we have consensus yet among scientists as to whether these models operate—as to which models are the right ones or which improvements need to be made in the models, whether it be path or CRI or whatever it may be.

Again, I do not suppose that I have the ability to tell whether one model is better or worse than the other, but what I can tell is that, from the input I am getting from other scientists outside the Federal Caucus, is that there is concern about the direction that is perceived to be being taken by the Federal Caucus.

So, with all respect to what you've said, it sounds to me like the National Marine Fisheries Service is pretty much committed to the CRI model at this point in time, and that any collaboration that may take place will take place within what that model says.

Is that what you're saying?

Mr. STELLE. Yes, but with an important caveat, and then I'd like to turn to Dr. Schiewe——

Senator CRAPO. Sure.

Mr. STELLE [continuing]. Because this really is in his bailiwick.

We absolutely anticipate that this CRI—we believe the CRI work as it now stands is incomplete. The modeling, itself, is incomplete. That it absolutely will need to be changed and improved, and our scientists are committed to that.

So it is not a static, done product. It is not a static thing. It is not a completed product, so far as finished. It will continue to evolve and improve as scientists inside and outside have the opportunity to critique it, suggest ways to improve it.

So, again, if the State of Idaho's scientific people have observations or suggestions about where its flaws may be and how to correct those flaws, I believe that the NMFS scientists are open to it. It doesn't necessarily mean that the NMFS scientists will agree, but absolutely there should be that critical review and exchange of——

Senator CRAPO. You are committed to reconvening the scientists in the sense to be sure that they have the chance now early to collaborate on these matters?

Mr. STELLE. Yes.

Let me turn to Dr. Schiewe on the workshops.

Senator CRAPO. Doctor.

Mr. SCHIEWE. Thank you, Senator. My name is Michael Schiewe. I am the head of the salmon science program at the Northwest Fisheries Science Center.

Let me first comment on the sort of transition from path to CRI. It is our impression that path accomplished a tremendous amount of what it had set out to achieve, but got to a certain point where the different assumptions used in the models were not going to be resolved until we collected new information and new data.

The CRI was an effort to move to a decision support mode which relied more on the collection of those data and hypothesis testing, rather than continuing modeling in the absence of those data.

The CRI has made a very strong effort and commitment to be as open to other scientists as we possibly could. Since July of last year we have held six workshops, one of which was convened with an environmental group, American Rivers, to look at the various aspects of path and CRI, comparing and contrasting the ways they use data, what kinds of data would be necessary, the importance of future monitoring.

We are continuing that effort. There is a workshop September 19 in Seattle inviting everyone from the region to view the most recent results of the CRI and ask for and welcome input. There is a workshop in November which will look more at the relationships between habitat and productivity, and there is a December workshop planned to look at the importance of monitoring.

Because of the uncertainties associated with the various actions being proposed, be they main stem, be they habitat, hatchery, or harvest, we are committed to making sure that we learn from these experiences and that monitoring will be a critical part of that process.

Senator CRAPO. All right. Thank you.

I'm going to shift gears for a minute and just kind of clear up a couple of questions—and, again, still for you, Mr. Stelle.

You indicated that at the appropriate time the agencies would be making requests for Federal funding support for whatever the recovery plan calls for. In that context, as you know, in these kinds of situations rumors get started or thoughts get promulgated that may or may not have validity, and one of the questions that has been raised to my office is whether the Federal agencies are contemplating requesting funds for preliminary engineering and design work on breaching the dam. Is that something that NMFS is considering?

Mr. STELLE. Yes.

Senator CRAPO. Could you explain that, given the proposal in the BIOP to try other options?

Mr. STELLE. Yes. The overall strategy, Senator, in the biological opinion is to keep all options open for the long term, and on the issue of Snake River dam draw-down, that particular issue, to continue the homework of the technical, scientific, and economic homework associated with evaluating the pros and cons of implementing the draw-down.

We believe that homework will take a period of time to complete, but the key component of it is the preliminary engineering and design work associated with a draw-down.

Senator CRAPO. When you say "draw-down," are you distinguishing that from breach?

Mr. STELLE. No.

Senator CRAPO. OK.

Mr. STELLE. I meant breach.

Senator CRAPO. Breach. OK.

Mr. STELLE. We believe that completing that homework is warranted on its own merits and also for purposes of ensuring that the overall program is as defensible as we can make it.

Senator CRAPO. It has also been reported that the final BIOP might include the possibility of breaching within 3 years, or at the conclusion of 3 years. Is that correct?

Mr. STELLE. I can only really speak to the proposal as we now have it and to assure the Senator that at this stage that proposal is current.

Senator CRAPO. Which is 8 to 10 years, and then re-looking at the issue?

Mr. STELLE. The proposal is a 10-year program, Senator, that has a series of—that places a very heavy emphasis on M&E work, first of all, and I don't want to ignore that because it is hugely important—escalated investments in monitoring and in research, particularly in those areas that we are largely ignorant, like hatchery risks, like tributary productivity, and estuary.

It calls for a series of reviews. First, it calls for an annual planning by the action agencies and the services to develop an annual program that we share with the Power Planning Council and review, and that has budgetary components to it that describes what we collectively intend to do in the hydropower arena and in the other arenas.

At year three it contemplates a retrospective of how we have done over the prior preceding 3 years to ask the question: Are we making reasonable progress in putting into place and doing what we said we were going to do?

At year five it contemplates a more major program review that looks at the biologic—the programmatic information, meaning have we done what we said we were going to do, and the biological information that is available to us at the time, including stock status, to ask the question: do we believe that this program, as we now have structured it, is on course with the recovery trajectory for these stocks or not? It contemplates a series of responses based on the stock status and program reviews at that time, a similar major program review at year 8, with a 10-year terminus.

Senator CRAPO. So we have a review at year 3, 5, and 8?

Mr. STELLE. Yes, with the major reviews contemplated at year 5 and 8. Why years 5 and 8? Because we believe that is the reasonable period of time when we are likely to have learned something new based on those measures that we intend to be implementing now, and we believe it is also a reasonable period of time by which to complete the work on Snake River dam issues, including the engineering work and the biological work on efficacy.

Senator CRAPO. Well, you can see the question that that raises, can't you? You're doing engineering work on breaching dams, and then saying that in 5 years we're going to revisit the issue of breaching dams.

Mr. STELLE. Yes.

Senator CRAPO. Some might conclude that this is a plan to breach dams in 5 to 10 years, you know, to begin the process at that point in time, and that the other scientific activities that are taking place, or the other recovery efforts that are taking place, are efforts to prepare for dam breaching.

Mr. STELLE. Senator, if that is a question about is this really a secret plan to breach Snake River dams, the answer is no, sir. First of all, it is not secret. We've laid out exactly what we want to do

and why. We believe, again, a very high imperative for us—and I hope for you—is that we promulgate a plan that is biologically credible and legally defensible, and that when we are sued next spring we will succeed in defending it.

We believe if we were to "take dams off the table," that that would not be a defensible position, and that the strongest and most-defensible position is to keep all options open, to pursue the overall course that we have charted here, a part of which is to continue, in a responsible and orderly way, doing the additional work that has not yet been done on the issue of Snake River dam removal, because clearly that would be the point of litigation.

Senator CRAPO. But you can assure me, then, that it is the sincere attempt of the Federal Caucus to try to achieve recovery without breaching dams?

Mr. STELLE. Absolutely.

Senator CRAPO. Well, let me shift over for a minute to you, Judy. Obviously, since NMFS is the lead agency, they're going to get the most focus on the questions, but——

Ms. JOHANSEN. I appreciate that.

Senator CRAPO. In fact, this little beeper may say fewer questions than you thought, maybe.

The northwest appears to be in a position of needing more available electricity right now to meet its future demand. Can you tell me whether the Department of Energy has studied what type of generation would be built to meet that demand and what impact that new generation would have on the environment versus the full operation of existing hydro facilities to try to meet that demand?

Ms. JOHANSEN. Well, the Department of Energy, per se, hasn't done that study, but let me answer in a couple of ways, if I could.

Senator CRAPO. Sure.

Ms. JOHANSEN. The most likely generation resource to fill our current need will be natural gas fired combined cycle combustion turbines. In fact, Bonneville operates the majority of the transmission grid, and when turbine developers want to build a project they come to us to ask for transmission interconnection. We have seen about 7,000 megawatts of interest in natural gas fired plants in our region.

Senator CRAPO. Judy, let me also ask you if you would comment on the question—you mentioned in your testimony you appreciated the input that I have brought forward with regard to the importance of collaboration. Do you see that it is possible for us to achieve the kind of collaboration we need in the next—well, how many months have we got, 3 or 4 months—to be able to get that kind of consensus in the region to move forward?

Ms. JOHANSEN. It is possible if the most senior decisionmakers in their respective entities—those being tribes and the States and the Federal agencies—are willing to commit the time and the level of activity necessary to draw that consensus. I don't really see that we have a choice other than to try, because the Council will be releasing its rule on the Columbia Basin strategy, and the Federal agencies, as Mr. Stelle has indicated, need to make decisions in this timeframe. I don't think we have any choice but to try to set aside the time to do it, but it is going to be an unprecedented effort. I'm hopeful and I'm committing the resources of my agency—

my senior people and myself personally, to making that collaboration work, and hopefully others will, as well.

Senator CRAPO. All right. Thank you.

I am going to have to bring the hearing to a conclusion right now because of other pressing matters, but I wanted to first apologize to those who didn't get to say everything they wanted to say. We will keep the record open if there are other items of input that you want to provide.

I hope that we have at least opened some issues up here today that will help us to proceed during the next 3 or 4 months to really focus our recovery efforts on things that we believe are going to have the biggest impact, and I can assure you that this is not the last hearing. There are a lot of people who wanted to testify today and tomorrow who were not even able to be included just because of the timeframe within which we had to operate in this first hearing. In fact, we made it a 2-day hearing to try to get even more witnesses in.

To those who were not able to testify, I want to again reassure them that that's not because we are not listening to their point of view. It's because we just have certain amounts of time in which we have to get this process started, and we will be holding further hearings.

For those who did testify, I want you to know that the door here is open. This is an issue that the Senators and Representatives from the Pacific Northwest, in particular, are extremely interested in, as you might guess, and whatever happens I'm sure that we're going to be involved in one way or another, so it is going to be important that we understand where you are headed and why.

I would simply say to the Federal Caucus that I appreciate your answers today and I encourage you in every way possible to engage in the most open collaboration that you can with the States, tribes, and other interested parties to make certain that when something is decided later this year it is something that we can hopefully step forward and lock arms with and go forward with as a region, rather than end up with more hearings and more conflict, because that truly—I think every witness here has agreed today that truly would be the most unfortunate outcome.

With that, again, I thank everyone for their attendance, and the hearing is adjourned.

[Whereupon, at 1:20 p.m., the subcommittee was recessed, to reconvene at 1 p.m. the following day, Thursday, September 14, 2000.]

[Additional statements submitted for the record follow:]

RECOMMENDATIONS OF THE GOVERNORS OF IDAHO, MONTANA, OREGON, AND WASHINGTON FOR THE PROTECTION AND RESTORATION OF FISH IN THE COLUMBIA RIVER BASIN

PREFACE

Almost two decades after Congress passed the Northwest Power Act and nearly a decade after the first Endangered Species Act (ESA) listings of fish in the Columbia River Basin, State and Federal agencies and Indian tribes have not agreed on a long-term, comprehensive, effective and coordinated approach to protecting and restoring fish of the Columbia River Basin, particularly salmon and steelhead.

Individually and collectively, we Governors have the authority to contribute to the efforts currently under way to develop an integrated, regionwide approach to recov-

ery of ESA-listed aquatic species. We hereby set forth our recommendations for key elements of a regional approach.

It is the Federal Government's role to administer the Endangered Species Act and to uphold tribal trust responsibilities. But the States also have an important role and responsibilities, as do other regional entities. Agreement on a regional approach, consisting of specific Federal, State and regional plans that protect both our salmon and our communities, as well as implementing the other recommendations in the attached document, will enable all of us to begin to fulfill our respective roles and responsibilities and meet the challenge that lies ahead.

We look forward to the needed collaboration and cooperation among State and Federal Governments as we plan for the recovery of ESA-listed aquatic species in the Columbia River Basin.

Sincerely,

DIRK KEMPTHORNE,
Governor of Idaho.

JOHN A. KITZHABER, M.D.,
Governor of Oregon.

MARC RACICOT,
Governor of Montana.

GARY LOCKE,
Governor of Washington.

I. INTRODUCTION

Almost two decades after Congress passed the Northwest Power Act and nearly a decade after the first Endangered Species Act (ESA) listings of fish in the Columbia River Basin, State and Federal agencies and Indian tribes have not agreed on a long-term, comprehensive, effective and coordinated approach to protecting and restoring fish of the Columbia River Basin, particularly salmon and steelhead. Individually and collectively, we Governors have the authority to contribute to the efforts currently under way to develop an integrated, regionwide approach to fish recovery.

We acknowledge a broad regional responsibility to protect fish and wildlife species. Such an effort is underway through the Northwest Power Planning Council's (Council) fish and wildlife program amendments. As currently envisioned, the Council's program should be an important preventive component because wise management will help the region avoid future ESA listings.

Because of the work of the last 10 years, including research and on-the-ground efforts, there is regional support for many key elements of fish recovery. In this document, we express our support for these elements as the nucleus of a regional approach to the recovery of ESA-listed aquatic species, particularly salmon and steelhead.

We want to stress that while we intend the consensus recommendations contained in this document to be useful advice and guidance to decisionmaking entities such as the National Marine Fisheries Service NMFS), U.S. Fish and Wildlife Service, Environmental Protection Agency and the Northwest Power Planning Council, our recommendations do not constitute a plan that can substitute for the procedural and substantive planning requirements of the Endangered Species Act, Clean Water Act, Northwest Power Act, or other relevant State and Federal laws.

We are keenly aware of the extent to which breaching the four lower Snake River dams has become a polarizing and divisive issue. Regardless of the ultimate fate of the dams, the region must be prepared in the near term to recover salmon and meet its larger fish and wildlife restoration obligations by acting now in areas of agreement without resort to breaching the four dams on the lower Snake River. In order to succeed, the region must have the necessary tools including a clear and comprehensive plan, adequate time, and sufficient funding. Our recommendations address some of those necessary tools.

II. KEY ELEMENTS OF A REGIONAL APPROACH

A successful approach to recovery of salmonids and other aquatic species must include a clear goal, objectives that describe and measure the environmental and biological improvements needed to meet the goal, and an aggressive series of explicit strategies and actions designed to achieve the goal.

The approach must address the so called "Four Hs" of human activities that influence fish and wildlife survival—habitat, hydropower, harvest and hatcheries and also account for what we call the "Fifth H"—the impact of these actions on humans.

Strategies and actions must be biologically sound, economically sensitive, and sufficiently flexible to accommodate alternative approaches depending on what works best. Finally, the approach must be truly coordinated, in the sense that it must account for and successfully integrate salmon recovery efforts ongoing at the Federal, regional, State and local levels.

With these features, this approach will have the public support needed for effective implementation.

Recommendations

Goal

The regional approach must include a clear goal so that, in short, the region can understand what constitutes success. Accordingly, the goal we suggest is protection and restoration of salmonids and other aquatic species to sustainable and harvestable levels meeting the requirements of the Endangered Species Act, the Clean Water Act, the Northwest Power Act and tribal rights under treaties and executive orders while taking into account the need to preserve a sound economy in the Pacific Northwest.

Objectives

The approach must include objectives geared toward accomplishing this goal. Objectives may be qualitative or quantitative. One qualitative objective should be a healthy, functioning ecosystem. In practical terms, this means that we prefer to benefit salmon through strategies and actions that emphasize and build upon natural processes. While we recognize this may not always be feasible, we think it is an important policy decision that will, in turn, clarify the region's choice of strategies and allow us to make most effective use of our finite financial resources.

It is our understanding that, at least in the Federal biological opinion and "All-H Paper" soon to be issued, quantitative objectives, also known as performance standards, will play an important role. The creation and use of performance standards will be critical—both in terms of allowing the region to move forward with specific strategies and actions and in measuring their success in achieving the desired environmental and biological improvements. Three criteria can ensure that performance standards are used appropriately:

• Performance standards must be grounded in the best available science. This means the standards must be technically valid as a measure of the success of actions taken to achieve salmon recovery. To that end, we recommend performance standards be subject to scientific peer review.

• Performance standards must be reasonably attainable. This means the standards must be clearly described, measurable and administered by a clearly designated entity with responsibility for compliance. This also requires that the actions to achieve the standards must be adequately funded in order to assure they can be implemented in a timely fashion.

• Performance standards must be implemented in a manner that coordinates the short-, mid-and long-term actions that are necessary to improve overall salmon recovery. Standards focused on near-term measures should describe the immediate on-the-ground actions that benefit fish. Mid-term standards should describe the success of the on-the-ground actions, and long-term standards should describe the overall success in achieving the desired biological response or improvement. Additionally, long-term standards should be crafted, wherever possible, in such a way that if improvement is not achieved, the performance standard would be useful in identifying the problem.

III. HABITAT REFORMS

In addition to the mainstem areas altered and blocked by dams, many key tributaries of the Columbia have inadequate flows for fish, impaired water quality, barriers to fish passage, unscreened water diversions or degraded riparian habitat. With Snake River and other dams in the Federal Columbia River Power System remaining in place, systemwide habitat improvements that respect private property rights, focused particularly in the tributaries and the estuary, become an even more critical component of salmonid and aquatic species recovery.

Recommendations

Partnerships

Because much of the habitat is on non-Federal lands, State, tribal and local governments, as well as private landowners, must be full partners in the recovery effort. To date, the National Marine Fisheries Service has not been clear with these entities about the specific improvements needed for recovery and has not conducted

regular discussions about how to address issues of mutual concern. We are disturbed by this lack of full partnership in what should be a collaborative effort. As one step to achieve greater collaboration, we recommend the President designate one official in the region to oversee Federal agency fish recovery efforts in the Columbia River Basin and serve as the regular point of contact with the States, local and tribal governments.

Water for Fish

Stream and river reaches throughout the Columbia River Basin have flow and water quality problems that impede regional fish recovery efforts. The States are setting water quality standards and preparing implementation plans in accordance with previously established schedules. The States are also reviewing instream flow levels to address biological requirements for ESA-listed aquatic species. We are concerned, however, that the timelines for these tasks be fully consistent with the timeline required for salmon recovery. Therefore, we recommend Federal assistance and support be made available to the States to better coordinate these timelines and, where necessary, to accelerate water quality improvements and to establish instream flows that benefit listed aquatic species in the Columbia Basin.

We support voluntary exchanges to obtain needed water for fish and support the development of water markets to effect exchanges among willing buyers and sellers. We believe this strategy has potential to contribute to fish recovery, and we are committed to support changes in State law or policies to facilitate this approach. We also recognize existing efforts to conserve water and support further assistance to promote conservation.

Protecting and recovering salmonids and other aquatic species requires protecting land on and around fish-bearing streams. Building upon successes elsewhere, we endorse creation of salmon sanctuaries that protect key aquatic habitats and related uplands through voluntary conservation easements, leases, land purchases, and tax-incentive donations. The region should attempt to obtain substantial additional habitat protections in the locations that promise the greatest benefits for fish.

Finally, given the major responsibilities that will fall upon private landowners, voluntary habitat improvement programs need to be fully encouraged through the use of a federally funded incentive program. Increased riparian fencing is an obvious place to start.

Local Recovery Plans

We strongly endorse the concept of local planning for recovery of salmonids and other aquatic species. This concept has the advantage of bringing together local and tribal governments with local citizens to develop and implement local recovery plans. A local focus also helps avoid duplication of efforts and "top-down" planning. Recovery plans developed at the local level, whether through State salmon plans, Federal agency actions or through the Council's process, must be complementary. The Federal Government has a fundamental obligation to assist local efforts in developing fish recovery plans. A premium should be placed on implementation of those plans that meet requirements of the Endangered Species Act, the Clean Water Act and the Northwest Power Act.

To assist the local planning effort, we recommend that State authorities designate priority watersheds for salmon and steelhead and that plans for these watersheds be developed by October 1, 2002. Plans for all watersheds in the Columbia River Basin should be developed by 2005.

We request that by January 1, 2001, the Council provide a report to the States detailing how the Council's amended fish and wildlife program has addressed the necessary integration of Federal, State and regional planning processes. Bonneville funding must be integrated with other funding sources for State and Federal recovery initiatives, and the Council should address this issue in its report as well.

Fish Passage

In the Columbia River Basin, over one-half of the original habitat area for salmon and steelhead has been blocked by mainstem and tributary dams. The largest losses occurred from the construction of the dams within Hells Canyon and by Chief Joseph and Grand Coulee dams on the upper Columbia

For the mainstem Columbia and Snake rivers, we must focus not only on currently accessible habitat, but also look for opportunities to increase the current level of habitat access with all dams remaining in place. A recent study by the Battelle Pacific Northwest National Laboratory and the U.S. Geological Survey (USGS) found a substantial percentage of the historic mainstem riverine habitat for Snake River fall chinook still remains unimpounded upstream of the Hells Canyon complex. Although there is still riverine environment where fall chinook historically spawned, it may not be capable of supporting fish today because of degraded qual-

ity. It must be better understood whether the present quality of the historic habitat is capable of supporting a self-sustaining population of fall chinook above the Hells Canyon complex. The feasibility of reproduction, including an evaluation of the existing habitat, is being investigated as part of the Federal Energy Regulatory Commission (FERC) relicensing process for the Hells Canyon complex. While mindful of the challenges involved, options and costs should continue to be assessed as part of the relicensing process. A similar challenge confronts reintroduction of migrating salmonids above Chief Joseph and Grand Coulee dams, particularly above Grand Coulee. Nevertheless, we encourage work currently under way to assess the possibility.

Each State commits, by October 1 this year and annually thereafter, to provide list of priority fish passage projects to the Council for proposed funding. The list could include such things as screening diversions and replacing culverts, as well as removal of, or passage at, tributary dams, as is being done at Condit, Wapatox and Marmot dams.

Estuary

The lower Columbia River estuary has come into focus as a vitally important component of salmon recovery. The region is fortunate that a water quality and fish and wildlife habitat plan has been developed by the Lower Columbia River National Estuary Program (NEP). This plan has identified actions to inventory those habitats critical for salmon health, as well as measures to protect or acquire such habitats. We believe that the Federal Government must immediately engage the States, tribes and local governments in implementing the NEP plan for the lower Columbia River estuary, including creation of the salmon sanctuaries referenced above.

Predation

The legitimate, but disparate, focus of varying Federal laws, including the Endangered Species Act, the Migratory Bird Treaty Act and the Marine Mammal Protection Act present management challenges as we seek to protect ESA-listed juvenile and adult salmon and steelhead that, in turn, are prey for the birds and mammals also protected by these laws. We support actions to improve the coordination among these laws so that they are not working at cross purposes.

We recommend that the U.S. Army Corps of Engineers (Corps), NMFS and the Fish and Wildlife Service develop a long-term management plan to address predation by fish-eating birds and marine mammals. The relocation of Caspian terns within the estuary was a good start but is not sufficient by itself. The number of Caspian terns, as well as that of double-crested cormorants, should be significantly reduced in the Columbia River Estuary. The Caspian tern predation rate on juvenile salmon and steelhead remains unacceptable, as is the inability of the Federal agencies to agree upon a common approach and a lead agency status for this effort. We recommend that such an approach be presented to the region by the appropriate Federal agencies by the end of the year.

As part of the long-term management strategy for seals and sea lions, we recommend congressional approval of NMFS's proposal to acquire additional authority to take seals and sea lions that persistently impact listed salmonid species.

The Ocean

Recent studies and salmon returns suggest that ocean habitat is a significant factor influencing salmon survival NMFS should work with the region to conduct an intensive study to address the role of the ocean in fish recovery, including the relative impact on fish mortality due to ocean predation, lack of food sources, temperature problems and harvest regimes. In addition, management of fish in freshwater should reflect new information about the ocean as it is developed. For example, it may be necessary to adjust hatchery production based on a better understanding of changes in ocean carrying capacity.

Interior Columbia Basin

Fully 50–60 percent of the land area in the Columbia River Basin is owned or managed by the Federal Government, including major headwater areas so important for fish. We believe modifications to management practices on these lands is essential to salmon recovery.

To assure these needed modifications occur, the interior Columbia River Basin needs a balanced strategy that can provide for stable and predictable multiple-use management on Federal lands for fish and wildlife and other purposes while permitting needed flexibility, particularly on private lands. The existence of such a strategy is long overdue, and we urge Congress and the Administration to work with the region to have the strategy in place by years end.

IV. HYDROELECTRIC SYSTEM REFORMS

Dams on the Columbia and Snake Rivers provide energy, flood control, transportation, recreation and irrigation benefits to the people and economy of the Pacific Northwest. At the same time, construction and operation of the dams altered the ecosystem in which the once-great fish runs of the Columbia River Basin evolved.

Recommendations

Capital Improvements at Dams

We acknowledge that the Columbia and Snake River hydropower system has been improved for fish passage. Nonetheless, the dams continue to adversely affect fish survival. Therefore, we support further modifications to the configuration and operation of the hydrosystem where appropriate and necessary to benefit fish and so long as the modifications do not jeopardize the region's reliable electricity supply.

To benefit salmon migrants, both upstream and downstream, expedited schedules should be established to design and install passage improvements.

Priority capital improvements must also include those necessary to address water quality issues relating to both temperature and dissolved gas. All capital improvements should benefit the fullest range of salmonid species and should offer demonstrated biological gains. Uncertainty regarding the long-term status of the four lower Snake River dams should not preclude making passage improvements at those four facilities.

Transportation of Juvenile Salmon and Steelhead

Consistent with our preference to emphasize and build upon natural processes, we believe strategies and actions should be implemented that provide the best possible survival for fish that migrate in the river through the reservoirs and past the dams. We recognize that in the short term there are survival benefits from continuing to use fish transportation as a transitional strategy. However, we believe that when ongoing research affirms that survival of listed salmon populations would increase from migration in an improved river environment, an increasing number of juvenile fish should then be allowed to migrate inriver. An immediate evaluation is also necessary of survival rates for fish transported by trucks compared to barges. If survival is lower in trucks and barging is an available alternative, then trucking should be discontinued.

Spill

We recognize the need to improve the riverine character of the mainstem Columbia and Snake rivers as a means of further improving successful salmon migration, spawning and rearing. Spill is important in this regard.

Spill is recognized as a highly effective means of passing juvenile salmon downstream, reducing the mortality associated with passage through many turbine sets and in most bypass systems. The use of spill should be improved—in duration, timing and quantity—at all the Federal hydropower projects. Experiments testing spill benefits at different levels and times of year should be expanded, and the impacts on juvenile fish survival from these alternative spill operations, including summer spill, should be carefully monitored and evaluated.

Flow

Flow management in the Columbia and Snake mainstems should continue as part of the mainstem strategy. Flow augmentation pursuant to State law, a key component of flow management, remains controversial. But there are ways to reduce the controversy in the future. First, Federal agencies must document the benefits of flow augmentation and the precise attributes of flow that may make it beneficial. Second, where the benefits of flow augmentation have been documented, migrating fish should be left in the river to benefit from it. Third, the region should review off-river storage for additional water if flow augmentation is going to continue to be a key strategy. Fourth, flow management should be designed to integrate all water-related statutory mandates, including not only the Endangered Species Act but also the Clean Water Act, and should consider impacts to non-anadromous listed and unlisted species. Fifth, implementation of flow management should fully account for actual water conditions so that, for example, if cool water is provided for temperature benefits, the benefits are not negated by simultaneous releases of warmer water from other sources. Sixth, additional water may be available for flow augmentation if flood control operations can be prudently altered. The Corps and NMFS should work with the region on a study to determine whether flood control rule curves can be reconfigured to allow shaping of flows to improve survival of migrating salmon and steelhead. Finally, the region should explore whether salmon benefits could be achieved through cooperative agreements regarding power peaking op-

erations, such as those currently in place for the Hanford Reach stocks and listed chum salmon spawning below Bonneville Dam.

V. HARVEST REFORMS

Salmon fishing has decreased to a level that represents a mere fraction of what once occurred. We commit to support a recovery approach designed not only to achieve ESA delisting levels but also to rebuild the runs to levels that support treaty and non-treaty harvest. But we believe rebuilding requires that all harvest may have to be reduced in the short term, together with aggressive actions taken to address mortality in the other life stages.

We respect the legal status and cultural importance of Indian treaty fishing rights. Changes in harvest management suggested below must be developed in partnership with the treaty tribes so they are consistent with the ongoing harvest and production litigation under *U.S.* v. *Oregon,* and also with Federal and State governments to comply with the Pacific Salmon Treaty.

Recommendations

Ocean Harvest

The United States and Canada have signed a 10-year Pacific Salmon Treaty that, for the first time, implements an abundance-based ocean harvest regime for chinook and coho salmon. The agreement places special emphasis on further restrictions for fisheries that incidentally harvest weak stocks, and on getting the required number of fish onto the spawning grounds. We agree that this is a critical first step in the overall management of Columbia River stocks, and we recognize that the increased complexity of the management regimes to carry out the intent of the Treaty will require additional funding.

Given that long-term, biologically-based management for the ocean is now in place, other steps can be explored to reduce ocean impacts on listed fish through use of more selective fishing techniques and a license buyback program that can reduce the current excess fishing capacity. Additional opportunities may exist to align viable fisheries with the opportunities available through a license buyback program given the excess fishing capacity that currently exists.

Finally, a random-observer program is needed to ensure the collection of information necessary for managers and the industry to reduce salmon bycatch mortality.

Columbia/Snake Mainstem Harvest

We support continuing current levels of tribal ceremonial and subsistence harvest. For commercial and non-treaty sport fisheries, we recommend that harvest rates, gear and timing in the mainstem fisheries be consistent with ensuring survival of the species and providing for their eventual recovery when combined with recovery actions in other sectors.

This means that harvest rates must ensure sufficient escapement to rebuild declining stocks. With inriver harvest rates ranging up to 31 percent for one of the listed stocks, we are not convinced that current practices are compatible with rapid recovery.

To achieve these reductions, we support increasing the selectivity of mainstem harvesting by exploring further gear, timing and location restrictions. The region must initiate research to better understand migration timing and movement of individual stocks to develop better selective fishing techniques.

Financial incentives must be broadened beyond selective fisheries to include economic incentives to reduce impacts to listed stocks, financial assistance for developing "value-added" fishery-related industries and mitigation of economic impacts to fishing-dependent communities.

Finally, hatchery operations must be modified so that excess fish are not being produced for fisheries where they cannot be harvested because of the impacts on weak stocks. Harvest goals must be linked to fish production goals. We expect State, Federal and tribal fish agencies to produce a long-term production and harvest plan that protects ESA-listed fish. To that end, we call for a new Columbia River Fish Management Plan to be agreed upon in time for the spring 2001 salmon fishery.

Terminal Fisheries

As another important means of achieving the mainstem reductions described above, as well as replacing lost mainstem fishing opportunities, fisheries should be established in terminal areas below Bonneville Dam and in Zone 6, similar to those currently taking place in Oregon's Youngs Bay. Commercial harvest opportunities would target the hatchery produced stocks returning to terminal areas. Reformed hatchery programs, which we address elsewhere in this document, could include establishing these terminal fisheries.

Law Enforcement

The region's fisheries law enforcement program should be strengthened to ensure accountability and to reduce illegal catch. Increased law enforcement should be concentrated and coordinated with habitat strategies to aid specific watersheds. We recommend this be accomplished through appropriate tribal, State and Federal law enforcement programs.

Control Competitor Species

We recommend changing existing sport fishing restrictions to concentrate on species that prey on, and compete with, salmon for food, including northern pike minnow. Sport fishing regulation changes also should strive to minimize effects of exotic species on native species. The region could experience short-term benefits from increased fishing opportunities for these competitor species.

VI. HATCHERY REFORMS

Since as long ago as the late 1800's, fish hatcheries have been seen as a tool to use in rebuilding fish runs decimated by overfishing or, in more recent times, as a means of producing large numbers of fish to support commercial harvest to mitigate the impact of dams. Yet our region's experience demonstrates that past hatchery practices have contributed to the decline of naturally spawning fish populations, as hatchery stocks increased while the naturally spawning component of the runs continued to decline.

It is time to recognize that hatcheries are used for multiple purposes, primarily producing fish for harvest but also for rebuilding naturally spawning populations through the technique of supplementation and for captive broodstock experiments. Careful thought must be given to how these techniques could maximize the efficiency of fish production to provide treaty, sport and commercial harvest opportunities while also protecting and rebuilding unique fish populations and complying with existing laws and legal processes, such as the *U.S.* v. *Oregon* litigation.

Recommendations

Implement the Artificial Production Review

The outline for redirecting artificial production of fish in the Columbia River Basin hatchery program is contained in the Council's recommendations in its 1999 Artificial Production Review report to Congress. We support these recommendations to significantly modify hatchery management practices among all federal and State salmon and steelhead hatcheries in the region.

To begin this process of reform, we recommend all hatcheries in the Columbia River Basin be reviewed within 3 years to determine the facilities' specific purposes and potential future uses in support of fish recovery and harvest. The Council should identify priority hatcheries that need expedited renew and complete the reviews within 8 months so that modification of hatchery operations can commence by January 1, 2001. Funding for hatchery reforms must be a joint federal, State and Bonneville responsibility. We recommend that, regardless of the funding source, future hatchery funding decisions take into account consistency with Artificial Production Review reforms.

Develop a Comprehensive Plan for Artificial Production

Consistent with the Artificial Production Review, the region's fish managers and tribes should jointly develop a comprehensive supplementation plan that includes aggressive monitoring and evaluation. We commit State agencies to work with tribal fish managers to develop such a plan. The plan should specify watersheds that can be used for supplementation, and also recommend respective tribal, State and Federal roles in implementation of the supplementation plan. We support the concept that certain watersheds, with local cooperation, should be maintained as wild fish refuges as a hedge against uncertainty inherent in artificial propagation, as well as a "control" for evaluating conservation hatchery efforts.

We anticipate this plan would be part of the renegotiated Columbia River Fish Management Plan.

Fish Marking

To facilitate a robust harvest program for hatchery fish in a way that does not impact wild fish, we endorse a program that results in the marking of hatchery fish that pose threats to ESA-listed fish, to the fullest extent consistent with the Pacific Salmon Treaty. We also urge tribal, State and Federal fish managers to put such a program in place promptly, as it will be difficult to implement many improved harvest techniques until it is possible to identify hatchery-reared fish

VII. FUNDING AND ACCOUNTABILITY

Since 1980, the use of ratepayer money to protect and recover fish in the Columbia River Basin has been inconsistent. Sometimes there has been strong oversight and scientific guidance, and at other times little oversight or scientific guidance. While this situation has improved in recent years, too often money has been used to fund bureaucracies and process as opposed to on-the-ground projects.

We anticipate that as the region's State, Federal and tribal agencies improve their collaboration and focus on meeting the obligations of the Endangered Species Act, Clean Water Act, Northwest Power Act and tribal rights under treaties and executive orders, it is likely that the cost of the effort will increase. As a result, we expect decisionmakers to redouble their efforts to ensure that funding decisions are informed by independent scientific review, all funding is used in an efficient and accountable manner, and funding is prioritized for actions that most directly advance the goal of protecting and restoring salmonids and other aquatic species to sustainable and harvestable levels.

Recommendations

Funding

Fish and wildlife programs should be streamlined, and rules should be more flexible and goal-oriented We endorse BPA's stated commitment to increase the amount of ratepayer dollars to support salmon recovery. Congress should similarly increase the amount of Federal appropriations, in recognition of the fact that fish and wildlife of the Columbia River Basin are national resources and their protection satisfies obligations in Federal law, including treaties with Indian tribes and Canada, the Endangered Species Act, the Clean Water Act and the Northwest Power Act.

Federal financial assistance, both from Congress and/or BPA, should be provided to help fund existing activities designed to improve ecosystem health and fish and wildlife health and protection. These include State and tribal on-reservation programs to develop total maximum daily loads (TMDLs), enhance water quality monitoring, secure water and land rights for fish and wildlife benefits, implement the Lower Columbia River Estuary Program, undertake other watershed restoration activities and, where necessary, establish instream flows.

Accountability

We believe the principles and activities in this document will protect the Federal Columbia River Power System and also recover and rebuild Columbia River Basin fish and wildlife. There will be a significant cost, but we expect the power system to pay only its fair share. Having said that, nothing jeopardizes the recovery effort, and the benefits we receive from the Federal Columbia River Power System, more than the perception and the reality of ratepayer funds being misspent. The region needs a strong program to ensure a far better accounting of the spending than we have received to date.

The Council should continue to work to ensure the accountability of each project it recommends to Bonneville for funding—accountability in terms of-meeting program goals and accountability for the expenditure of ratepayer money.

Accountability for meeting goals.—All projects recommended by the Council should have explicit quantitative goals, and the projects should be rigorously evaluated for their ability to meet these goals.

Accountability for expenditures.—Expenditures by Bonneville, the Council, the Columbia Basin Fish and Wildlife Authority, State agencies and project sponsors may make sense individually, but not when considered in total. Planning and overhead expenses must be kept to a minimum, and project expenditures should focus on activities that benefit fish and wildlife.

Specifically, we recommend that the Council:

• *Prepare an Annual Accountability Report.*—To better understand Bonneville's expenditures in a basinwide context, and to improve accountability to the ratepaying public, the Council should prepare an annual report to clearly document progress toward meeting fish and wildlife mitigation goals, and how ratepayer money is being spent. A specific breakout should be provided on funding for ESA-listed species.

The report could provide assurance that Bonneville's expenditures are directed toward on-the-ground projects rather than redundant or excessive planning processes and that funding for research is dearly focused and prioritized. By addressing project failures as well as successes, the report could show progress—or lack of it—toward goals and demonstrate that projects are being effectively monitored and evaluated.

• *Consider Shifting Contract Management.*—The Council and Bonneville should study the possibility of transferring project contracting responsibility from Bonneville to a neutral entity.

In its unique regional role, the success of Bonneville depends on maintaining good relations among a wide range of parties, including many of the parties with which it contracts for fish and wildlife project implementation. This need for good relationships creates a potential conflict with the regional interest in accountable and businesslike implementation of fish and wildlife projects, and the enforcement of contractual terms. Simply put, there would be an inherent efficiency in having a neutral entity responsible for project contracting. Transferring contracting authority to a neutral entity also would avoid complicated, time-consuming Federal contracting procedures.

This proposal should not be seen as a criticism of Bonneville's fish and wildlife staff but as a shift of responsibility that would benefit both Bonneville and the fish and wildlife program by increasing the efficiency of program management, reducing the potential for conflicts of interest and improving public accountability for the expenditure of ratepayer dollars. If the shift occurs, a more independent oversight of contract management should be structured in a way that allows Bonneville to ensure its contracts are properly and efficiently carried out.

• *Establish a Coordinated Information System.*—Also under an improved accountability initiative, but singled out for special attention, is the need to establish a coordinated information system. Although the Pacific Northwest is data rich, it is information poor. Data is stored in a random and haphazard fashion in some cases, in highly organized and computerized fashions in other places, and in combinations of these approaches in still other cases. The region needs a standardized information system that is capable of providing answers to basic questions regarding the documentation of progress toward recovery of salmon and other aquatic species. This information needs to be provided in a form accessible to everyone as part of the annual accountability report. Creating such a system is a task for the Council; we ask that it be done by October 1, 2001.

VIII. THE CHALLENGE AHEAD

The Columbia River Basin is a great natural resource and a dynamic economic engine and, for both these reasons, is critical to the well-being of the four States in the region. The Columbia River Basin's hydropower system is part of our legacy in the Northwest, built through the foresight of our leaders and the skill and determination of our workers, on our waterways and across our landscapes.

But we also recognize the impact the hydropower system has had on our fish and wildlife populations, particularity anadromous fish. We have benefited in an economic sense but we have lost a healthy ecosystem. We wish to restore that healthy ecosystem as pan of the Northwest legacy we leave to our children and their children

This is a challenge of course, and one we accept. It is the Federal Government's role to administer the Endangered Species Act and to uphold tribal trust responsibilities. But the States also have an important role and responsibilities, as do other regional entities. Agreement on a regional approach, consisting of specific federal, State and regional plans that protect both our salmon and our communities, should be reached and accepted by Federal and State officials in consultation with tribal leaders no later than January 1, 2001. Reaching such agreement, as well as implementing the other recommendations in this document, will enable all of us, together, to begin to fulfill our respective roles and responsibilities and meet the challenge that lies ahead.

STATEMENT OF HON. DIRK KEMPTHORNE, GOVERNOR, STATE OF IDAHO

Mr. Chairman and distinguished members of the subcommittee, I appreciate the opportunity to appear before you today and articulate my perspective on one of the most complex issues of the day—salmon recovery in the Pacific Northwest.

INTRODUCTION

One week ago today, I was at Redfish Lake 900 river miles inland from the Pacific Ocean near Stanley, ID, just over the summit from Sun Valley. The name originated from the color of the beautiful salmon returning to spawn in their birthing waters. I was joined by the Idaho Department of Fish and Game, legislators, and school children from Filer and Stanley to observe and assist the 36 (26 natural 10 hatch-

ery) marvelous salmon finish their return from the ocean. These wild and hatchery salmon had returned to spawn and start the cycle anew.

It is Idaho's intent and it is my intent and the intent of those school children to perpetuate this stock and all stocks of Idaho's fabulous salmon. Our commitment is unquestionable. The questionable part is whether the Federal agencies are to help or to hinder our efforts. Conflicting Federal laws and past haphazard coordination have substantially contributed to the decline of our salmon.

I. IDAHO'S PERSPECTIVE ON THE PROBLEM

Prior to the time I took office in January 1999, my administration began preparing for the upcoming decisions that have now been released for public review and comment by the Federal agencies. We have been preparing for a very compelling reason: we stand to lose nothing short of everything in the aftermath of the salmon recovery debate and, perhaps, ironically, with no recovery of the salmon.

Let me give you Idaho's common perspective on this issue as perhaps articulated by some of our stakeholders in this process.

The Federal agencies charged with recovering the anadromous fish believe that they need Idaho water to help flush the fish out to the ocean. Some groups argue that the four Snake River dams, which support important transportation and agriculture components in Idaho, should be destroyed.

Meanwhile, some of the fish that leave Idaho in the spring are being eaten alive by birds in the estuary before they even have a chance to migrate to sea. Once out in the ocean, they might be harvested.

Several years later, if they are lucky, they will return and could be eaten by predators at the mouth of the estuary or, further up the river, subject to tribal harvest.

My point of all this is not to point the finger at any single component of this problem, but instead describe how from Idaho's perspective, sacrificing our State's water and voluntarily improving our native habitat may seem like a futile exercise when it is such a Herculean effort to get anadromous fish out and back to our State. Our State is ground zero in the recovery of these important species.

II. THE FOUR GOVERNOR'S AGREEMENT

I would like to briefly describe what we see as our role in recovering the species and how we have contributed to this process.

I have long believed that only through a regional collaborative effort will there ever be a real chance for recovery of anadromous fish in the Pacific Northwest. In July of this year, I was pleased to join the other Governors in the region in an unprecedented agreement on the essential principles for recovery and recommendations to implement these recommendations.

The agreement recognizes that every State in the region and all of the stakeholders impacted by this process must step forward and contribute. No one State can recover salmon alone, just as no single State can afford to shoulder a disproportionate burden of the process. Only through regional cooperation—not dictates by the Federal Government—is there a chance to achieve real success.

The Four Governors strategy involves several key elements important to Idaho.

First, the Federal agencies should document the benefits of flow augmentation and the precise attributes of flow that may make it beneficial.

Second, harvest impacts must be reduced on listed, wild fish in the ocean and Columbia River. Idaho has been blessed with a great return of salmon this year, in fact, the most in nearly a quarter century. Most were hatchery fish and therefore not counted toward Endangered Species Act listed salmon or for salmon recovery. We can get hatchery fish through the gauntlet of downstream impacts but we don't get the same with wild salmon. Why? Because our brood stock is limited in numbers and we are breeding the smallest of the salmon because the fishery nets only allow the smaller fish to escape upriver to spawn.

Third, the region must implement actions now that can and should be done without breaching the four lower Snake River dams.

Finally, predation of all kinds, including terns, and marine mammals, must be limited.

I want to publicly express my appreciation to Governor Kitzhaber, Governor Racicot, and Governor Locke for their diligence and cooperation in achieving this historical milestone. The gentlemen here today to speak on their behalf, Eric Bloch, John Etchart and Larry Cassidy, also played key roles along with Dr. Tom Karier and Bob Nichols from the State of Washington. I also want to acknowledge the work of Jim Yost and Michael Bogert of my staff.

I have enclosed a copy of the Four Governors Recommendation for the subcommittee members.

What can be done now and in the near-term to help the fish?

I believe that any effective program to recover the species must be supported by science, politically palatable, and economically feasible. My perspective on this problem is slightly different from the traditional "All–H" approach–Habitat, Harvest, Hatcheries, and Hydropower. I start by adding one more H–Humans.

A. Humans

From my vantage point, much of Idaho's culture and economy are at stake in the Biological Opinion and the All–H documents to be discussed before in this subcommittee today.

No singular component of the salmon recovery burden should be borne on the backs of any single stakeholder to the process, including the States. Let me give you the most recent example of this problem.

The United States Army Corps of Engineers recently estimated that over 640,000 listed salmon and tens of millions of hatchery stock are eaten alive at the mouth of the Columbia River estuary during the spring migration season. The culprits: the world's largest colony of voracious fish-eating Caspian terns who just happen to be nesting on federally-created Rice Island at the time the young salmon and steelhead are attempting to make their way to sea.

Idaho participated in a collaborative process involving the States and Federal agencies, including the Corps and the United States Fish and Wildlife Service. This process resulted in a plan that involved providing alternative nesting habitat for these birds, which happen to be protected under the Migratory Bird Treaty Act. The plan that was developed included a component that included harassing these birds from the most critical of areas where the endangered fish are slaughtered by the birds.

Not surprisingly, a group of environmentalists brought a lawsuit and claimed that the Corps had failed to comply with the National Environmental Policy Act and asked that the harassment strategy be halted immediately.

Their key piece of evidence? Written comments by the Fish and Wildlife Service that science had yet to prove that saving 15–25 million smolts, of which 640,000 are ESA listed smolts, had any proven benefit to salmon recovery. A Federal judge bought the argument and endangered fish are now being consumed by non-endangered birds with the willing assistance of the Fish and Wildlife Service.

I submit that as a matter of fundamental science, a protected young salmon that is eaten alive by a bird is not going to come back to Idaho to spawn.

However, my prospective is a bit more focused. At the same time that Fish and Wildlife is telling us that saving 640,000 listed fish will do nothing to recover these endangered species, the Federal Government is assessing how much Idaho water is needed to seemingly make fish migration easier. The answer to this question goes to the very life blood of Idaho's agricultural economy in the Upper Snake River Basin.

How can the Federal Government tell Idaho and the world that preventing the slaughter of hundreds of thousands of endangered young salmon in the Columbia River estuary will have no impact on the problem, and then tell us that more water from our State is needed to get the fish out to sea? Several weeks ago, I received a report that during the height of both the summer migration and irrigation seasons in the Lemhi Basin, there didn't seem to be enough water to go around. I sent my staff over to talk to the irrigators and see what could be done to accommodate both their rights to irrigation water and the needs of the fish.

Their message? Governor, you tell us when the fish need the water and we will make it available. They also told us that no one knows or cares about these salmon more than those who have been living in that basin all of their lives.

The aftermath of this has been a renewed spirit of cooperation between the locals, the State, and the Federal Government. Our discussions to resolve this problem represent a model of inter-governmental relationships, and I am optimistic that we will achieve success.

But I remain firm that the only way we will see results in the region is if State law is respected and the locals are brought into the process from the beginning.

I use this example to highlight the contributions from all of the stakeholders that must occur in order for there to be any chance of progress in salmon recovery. With this, I will quickly move on to our perspective on the other H's.

B. Habitat

My perspective on habitat improvement is that the Endangered Species Act, as currently implemented, provides no safe harbors if private landowners voluntarily improve conditions for salmon. Through Idaho's own initiative, Idaho stakeholders

have joined together to conserve important habitat. One example is Burgdorf Meadows, where over 51 percent of critical spawning for summer chinook has been preserved. Burgdorf Meadows is a classic example of Idaho stakeholders working together to achieve a common goal.

Stakeholders would voluntarily undertake habitat improvements if there were some safeguards in place so that after those improvements were implemented, the Federal agencies or private lawsuits would not try to take a second bite of the apple or demand that they make additional improvements. After assuming a voluntary load, this final straw may break the back of even an economically viable camel.

But I also understand that we can make important additional habitat improvement in Idaho. I am committed to identifying things we can do immediately, such as diversion screening and water quality improvement, in order to make things better for fish in Idaho.

On the other hand, as we move forward on these things, we expect that the region will look seriously at predator control and improvement in the estuary conditions.

Recent studies and salmon returns suggest that ocean habitat is a significant factor influencing salmon survival. NMFS should work with the region to conduct an intensive study to address the role of the ocean in fish recovery, including the relative impact fish of mortality due to ocean predation, lack of food sources, temperature problems and harvest regimes.

C. Harvest

Idaho continues to be perplexed that wild fish, listed under the Endangered Species Act, can be subjected to a regulated harvest at all. Can you imagine the hue and cry if the government suddenly declared a "harvest" season on the grizzly bear?

I am sensitive to the industries in the Pacific Northwest that depend on a yearly salmon harvest, and I am similarly mindful of the harvest rights possessed by Native American tribes through treaties with our Federal Government.

Idaho, as with other States in the region, is committed to the process of discussing harvest allotment through the *United States* v. *Oregon* litigation. This is one area where collaboration by all of the region is ongoing and should continue.

D. Hatcheries

The hatchery arena has a symbiotic relationship with harvest allocation, and Idaho generally supports scientifically-based hatchery programs.

In the case of captive brood stock hatcheries, this remains a program of vital importance to Idaho. This is the program at Redfish Lake I referred to earlier.

As a means of supplementation, the hatcheries in Idaho provide our sportsmen an opportunity for a fishing season, and are an excellent management tool while we rebuild our wild stocks.

Hatchery operations must be improved to provide salmon for harvest "conservation (mitigation) hatcheries" as required in the Lower Snake River Fish and Wildlife Compensation Plan established when the four dams were constructed to mitigate for the losses caused by the dams. This was done when the estimated mortality at the dams was about 47 percent. We have now reduced that mortality to about 25 percent, yet we continue to maintain or increase the number of smolts for mitigation.

We also have supplementation hatcheries that provide additional salmon stocks to those streams with wild or natural stocks so that the numbers can be increased. The question is which of those wild stock areas should be maintained as wild, native, or natural salmon refuges without the interference of the supplementation stocks.

The mitigation stocks are of a high enough number that their harvest is causing an impact on wild natural stocks (the listed species). All these fish may return from the ocean to the Columbia River at about the same time, and it is difficult to only harvest the mitigation hatchery stocks and not harvest some of the wild stocks. This incidental take of wild stock when we try to harvest mitigation stocks is currently excessive.

Some ways it can be reduced is by using a different method of harvest (from nets to lines or fish wheels) or selective fisheries, which is fishing only when the mitigation hatchery fish are present or to use terminal fisheries (fishing for the mitigation stocks after the wild stocks have gone up a tributary to their spawning area). We have successfully used larger scale nets that have allowed the smaller stocks to continue to migrate while the larger fish are caught. The impact to Idaho is that for years our brood stocks were the smaller fish and not the biggest healthiest brood stocks.

E. Hydropower

From my perspective, the debate over dam breaching will continue as long as reasonable scientists differ over the data. One fact that is not disputed is that breach-

ing the four lower Snake River dams would have no benefit to the vast majority of our endangered salmon. Eight to twelve listed species would not be affected by breaching, as they reside downstream of these dams. Even if the science was clear today—and it is not—it would take at least a decade of political debate right here in Washington before they are removed.

The costs of dam removal could be as high as $1 billion, and, by the Corps' own calculation, it could be several years before the silt and debris left behind the dams becomes manageable enough to provide any benefit to the fish. I am left with the unsettling impression that with such political and scientific controversy ahead in the next 20–25 years, the game could be lost before it has even started.

Accordingly, until I have clear evidence that the salmon can expect immediate improvement if the dams are removed, Idaho is opposed to taking on the risks to our Port of Lewiston and Idaho agricultural economy.

But this perspective does not end the "to do" list for the dams. During my tenure as your colleague in the U.S. Senate, I was committed to investing in dam improvements while the science continues to be debated.

The best and brightest minds in the Federal Government and the States should be dedicated to making fish passage at the dams better so that the fish receive the benefits of the finest technology our nation has to offer.

I support minimum gap runner turbine technology in order to improve the reasonable accommodation that must be made for the regions' hydropower needs and the salmon migration. This technology is being installed at Bonneville Dam and the preliminary results have indicated increased fish survivability.

Likewise, fish guidance curtain (screen), turbine intake screens, fish collectors, adult fish ladders, juvenile fish bypass systems, and spillway defectors have suffered from technological neglect and installation while the controversy over the existence of the dams has raged onward. This must end immediately, because the losers in the failure to make capital improvements in these structures are the salmon.

Finally, at the risk of sounding repetitive, I must put on the record my position about augmented Snake River flows as a benefit to out-migrating juvenile salmon. At my direction, the Idaho Department of Water Resources has studied the issue extensively in cooperation with the Idaho Department of Fish and Game. They have determined that based on the current flow-survival data developed by NMFS, there is no basis for NMFS concluding that early or late summer flows from the Upper Snake provide significant biological benefits for out-migrating juvenile salmon.

There is not enough water in the Snake River Basin to meet the Biological Opinion flow objectives. These flow objectives are essentially arbitrary thresholds. The NMFS has for too long been absorbed with securing a few extra acre feet from this or that reservoir without apparently ever stopping to question whether the unending struggle over flow augmentation is really delivering salmon recovery.

For instance, when NMFS briefed the States last spring regarding the "Herculean" measures contained in the new Biological Opinion, the very first measure mentioned was additional flow from the Snake River Basin. While the effort to secure this additional water may indeed be Herculean, the resulting benefit to the fish is microscopic even under the most optimistic assessment of the flow/survival relationship.

There is an understanding—often acknowledged in private but seldom spoken in public—that the upper Snake River Flow augmentation measures are really an effort to secure political balance rather than meaningful benefits to the fish. The notion is that "everyone must hurt" in order for a regional plan to be politically viable. Some of the more aggressive, or perhaps cynical, participants in the salmon recovery debate go further to suggest that draconian levels of flow augmentation should be extracted as a kind of punishment for failure to adopt dam breaching. Their thinking is that if the pain associated with "aggressive" non-breach measures can be ratcheted up high enough, then perhaps the region will opt to take out the four dams on the lower Snake River.

Regardless of whether NMFS subscribes to either of these views, we have the distressing sense that NMFS' campaign for more upper Snake River flow augmentation represents a grand political gesture rather than a clear-eyed examination of the biological benefits, the economic costs, and environmental impacts of what is being proposed.

Idaho's complaints about the lack of disciplined analysis of flow augmentation have sometimes been met with the response that "every little bit helps." This aphorism is no substitute for the critical thinking required for a true salmon recovery plan. The fact is that the Federal Caucus is not doing "every little bit" it can—nor should it if the resulting gains for the fish are meager and the impacts are massive. The record is replete with instances in which the Federal Government has chosen not to do more for the listed species based on non-biological factors.

For instance, NMFS actually permitted the harvest rate on Snake River spring chinook to increase this year relative to recent years because of the large number of hatchery fish returning to the river. This increase was justified on the basis that additional harvest amounted only to a few percent of the overall run. But, this does not square with the "every little bit helps" principle that underlies upper Snake River flow augmentation efforts, which deliver even smaller increments of survival. Moreover, NMFS' biological opinions allow cumulative harvest rates on Snake River fall chinook in ocean and in-river fisheries to remain at close to 50 percent. Tern population numbers in the Columbia River estuary continue to climb—with significant impact to the entire Columbia salmon and steelhead run. Yet, NMFS still has not taken decisive action to move these predators from the estuary.

Nonetheless, our State Legislature enacted and I signed a 1-year authorization for the Bureau of Reclamation to access 427,000 acre-feet of Idaho water for flow augmentation purposes. This good-faith gesture should be recognized as my willingness to continue to participate in a regional solution.

IV. CONCLUSION

I appreciate the opportunity to present my perspective on these important issues today, and I look forward to the challenging work ahead for all of us in the region.

Idaho is optimistic that the State and regional stakeholders will join together and empower themselves throughout this process. However, Idaho remains concerned that the All–H Paper has failed to give deference to the objectives outlined in the Four Governor's Recommendations. At the end of the day, the best solutions are those that are owned by the participants rather than those that are imposed by Federal edict.

Thank you.

STATEMENT OF SAM PENNEY, CHAIRMAN, NEZ PERCE TRIBAL EXECUTIVE COMMITTEE

Mr. Chairman and members of the subcommittee, thank you for the opportunity to testify. I am pleased to be here today to speak on behalf of the Nez Perce Tribe and the Columbia River Inter-Tribal Fish Commission. As you know, we received voluminous draft documents from the Federal Government on July 27. We are still in the process of reviewing these documents, particularly their technical aspects. However, I would like to say at the outset, that the tribes' position supporting breaching the Snake River dams and our position supporting an economic investment package to local communities affected by breaching these dams remain unchanged. We see no new science or information that would indicate other actions will be sufficient to recover Snake River chinook throughout the range of their current habitat.

I would like to offer the following observations.

• The Federal proposal fails to comply with the Clean Water Act. The United States District Court recently reaffirmed that the Corps of Engineers must comply with federally-approved water quality standards for temperature and dissolved gas in the *National Wildlife Federation* v. *Corps of Engineers* litigation, yet the Federal proposal does not contain actions that will be implemented to achieve these standards.

• The Federal proposal is a plan for extinction of Snake River salmon stocks. The Federal proposal sanctions the extinction of spring chinook "index stocks" in tributaries of the Salmon River where salmon habitat is pristine.

• The Federal proposal fails to recognize that if the dams are not breached, large amounts of additional water from the Upper Snake River will be required for flow augmentation to provide the survival benefits that juvenile salmon need.

• The Federal proposal's reliance on yet-to-be-developed "performance standards" to delay breaching the four Lower Snake River dams and to get the hydrosystem out of jeopardy ignores the most significant performance standard—the status of the fish. The risk of extinction for Snake River salmon has not been significantly reduced since they were listed under the Endangered Species Act over 8 years ago and the Federal proposal does not ensure any improvement for Snake River salmon. Scientists predict Snake River spring chinook will be extinct by 2017.

• The Federal proposal's reliance on "offsite mitigation measures" to delay breaching the four lower Snake River dams and to get the hydrosystem out of jeopardy does not preserve and rebuild salmon runs. Based on the Federal proposal, we expect to see continuing losses of local salmon populations particularly in basins above four or more hydro projects, even in areas of pristine habitat that is located in Idaho wilderness areas. Even if offsite mitigation measures were appropriate for certain

stocks, there is no budget or implementation plan for such measures in the Federal proposal.

• Other than seeking to have tribal governments further restrict our already voluntarily restricted tribal fisheries, the All–H Paper describes no role for tribal governments as co-managers. By its silence, the Federal documents would appear to deny the successes of the tribes in their salmon recovery efforts in basins like the Clearwater, Umatilla, Hood, and Yakima. This is especially frustrating since we held numerous meetings with the Federal Government, and our detailed tribal proposals seem to have made no impact at all.

We oppose the new concept of "full mitigation" as described in the Hydro BiOp. This is a concept based upon the desires of Bonneville and not on either the ESA, the biological needs of salmon, or treaty case law. Under this concept, Bonneville's mitigation responsibilities are "capped" by estimating the number of fish that would survive if they migrated through a mythical Columbia River that is dam free. Among other things, the proposal ignores the decades of dam impacts that have eroded the salmon populations.

In conclusion, I would like to say that the alarm on the extinction clock has gone off long ago. Neither the salmon, nor the Tribes, nor the people of the Northwest have the time to delay breaching the four lower Snake River dams and implementing the "major overhaul" the United States' operation of the hydrosystem needs. I am deeply disappointed the United States has chosen to ignore its treaty and trust obligations. We will not be deterred from our solemn duties to act on behalf of the salmon and our people.

STATEMENT OF LIONEL Q. BOYER, CHAIRMAN, SHOSHONE-BANNOCK TRIBES

My name is Lionel Q. Boyer, Chairman of the Fort Hall Business Council, the governing body of the Shoshone-Bannock Tribes. In 1868 the Shoshone and Bannock Tribes agreed to a treaty to have peace with the United States under Article Six of the U.S. Constitution (Fort Bridger Treaty of 1868, 15 Stat. 673). Our various bands and families were relocated to the Fort Hall Indian Reservation in Eastern Idaho during the European settlement of the western United States.

The Fort Hall Indian Reservation is a place where people and animals migrated to spend winters. The annual migration of my people to secure our subsistence was preserved in the Treaty because we reserved the right to hunt, fish and gather on unoccupied lands of the United States. Hunting the salmon is a significant part of our way of life. The name for the salmon, Agai, has been used to define our people as the Agaidika. No one can understate the importance of this resource to the Shoshone and Bannock peoples. We have continued to exercise our right to hunt salmon in the Columbia River Basin since the Treaty was signed. The Shoshone-Bannock Tribes are today co-managers of the anadromous fish resource in the Columbia River Basin and have continued to work toward improving the habitat and supplementation efforts.

Salmon need four habitats in which to survive and prosper. (1) They need a place to spawn (clean gravel and cold clear, running water), (2) a place for their young to rear (woody debris and other nooks and crannies, undercut banks, and shade from overhanging vegetation), (3) a place rich in food for them to grow into large mature adults (the ocean), and (4) a corridor in which they can travel to and from their place of origin. The National Marine Fisheries Service has failed to honor this simple science of the salmon.

Man has changed all of these habitats—but each to a different degree. The Salmon River, where about half of the entire Columbia Basin spring and summer chinook salmon historically came from, is largely in good shape. Most of the Salmon River is protected by its rugged inaccessibility and its wilderness area status. The National Marine Fisheries Service is wrong to conclude that the greatest opportunities for survival improvements of listed Snake River salmon may hinge on efforts to restore health to the tributaries. Although some tributaries in the Salmon River drainage are not as healthy as they should be for salmon (for example, the dewaterings and excessive irrigation diversions in the Lemhi River), the vast majority of the habitat is very healthy for salmon spawning and rearing.

The Shoshone-Bannock Tribes look forward to working as resource co-mangers with the Federal and State agencies to correct problems in the Salmon River—primarily in tributaries to the Salmon River from the Lemhi River upstream to the headwaters of the Salmon River. However, no evidence exists that indicates these problems are the major cause of the declines in wild fish. The wild fish populations in the Middle Fork Salmon River—which is a Wild and Scenic River almost completely within the Frank Church Wilderness Area and in almost pristine condition—

continue to decline at least at the same rate as the populations in the upper Salmon River. This evidence suggests that the major problems—and thus the major areas to concentrate recovery efforts—are outside of the Salmon River system.

The conditions in the Pacific Ocean are a concern to all of us. However, very little can be done by humans to protect the salmon during their time in the ocean, other than reducing or eliminating harvest. The Shoshone-Bannock Tribes applaud the efforts of the National Marine Fisheries Service to reduce harvest impacts over the past 8 years. However, the position of the Shoshone-Bannock Tribes is that there should be no interception fisheries in the ocean and mainstem Columbia River while the weak stocks of wild fish are mixed in with more numerous runs. Fisheries should instead be conducted in the tributaries that have runs which can support harvest.

The National Marine Fisheries Service is particularly unjust in its allocation of the conservation burden when ocean and mainstem Columbia River fisheries can harvest listed Snake River salmon and steelhead while the Shoshone-Bannock Tribes cannot harvest those very same fish once they return to the Salmon River.

The National Marine Fisheries Service is wrong to conclude that there are only two roles for hatcheries. The two roles they state are: (1) reform existing hatcheries to prevent negative effects from hatchery-origin fish on wild fish; and (2) use hatcheries to conserve wild fish. These are good roles for hatcheries. However, the most important role for hatcheries is to use them to rebuild wild fish populations. The Shoshone-Bannock Tribes call this concrete-to-gravel-to-gravel management. Scientists call it supplementation. There are appropriate ways to use hatchery-origin fish and release them into wild areas for those fish to return to rebuild the listed wild populations. The NMFS is wrong to use genetics as the overriding factor in impeding the Shoshone-Bannock Tribes from pursuing the production actions that the Tribes have successfully initiated. Many of the wild areas no longer contain any fish, so even if the NMFS is correct with their genetics theories, it would be a moot point. We can no longer manage for genes, and need instead to manage for fish. The Recovery Strategy needs to aggressively pursue supplementation of listed fish with available hatchery-origin stocks.

The wealth of scientific evidence concludes that the migration corridor is the primary problem facing the Snake River stocks of listed salmon. The Shoshone-Bannock Tribes are very concerned that the National Marine Fisheries Service concludes that there have been significant improvements to the migration conditions through the hydrosystem. The evidence does not support this conclusion. The runs of listed salmon and steelhead to the Snake River continue to decline as my technical staff will provide testimony on tomorrow. The changes to the hydrosystem have failed to reverse the declines in listed salmon and steelhead runs in the Snake River. The National Marine Fisheries Service greatly underestimates the necessary survival improvements that are needed to stop the declines and move toward recovery.

The Shoshone-Bannock Tribes believe that the listed Snake River salmon and steelhead cannot wait another 8 to 10 years before the necessary major improvements and actions are taken to recover these fish. We are now at a very critical stage of crossing the line to extinction. We are extremely disappointed that the 1995 Biological Opinion has not been adhered to. That Opinion was a product of the National Marine Fisheries Service losing the *Idaho* v. *NMFS* lawsuit. That Opinion allowed a decision to be made in 1999 to either breach the lower Snake River dams or else continue with vain attempts to fix the dams with screens, curtains, bypasses and barges. The evidence is very clear that the technological attempts have not worked.

The Shoshone-Bannock Tribes believe that technological fixes to the lower Snake River dams will not allow the listed Snake River salmon to survive. The 1999 decision should have been to pursue congressional authorization to breach those dams. The Recovery Strategy and the new Biological Opinion should call for the breaching of the four lower Snake River dams now. The Shoshone-Bannock Tribes have been saying this longer than any other entity. Thus our warning, once again, is that we have waited too long to fix the river rather than trying in vain to fix the dams, and we will continue to have to tell you that "we told you so." However, these words will still not bring back the salmon.

Breaching the four Lower Snake River dams eliminates the need to use middle and upper Snake River water for salmon flow augmentation. It eliminates the need to draw down Dworshak and Brownlee reservoirs, which greatly benefits those aquatic resources and the economies that depend upon them. The four lower Snake River dams only produce 4.6 percent of the Pacific Northwest's electrical energy, which can be replaced through alternative sources and conservation. The economies created by recovered salmon and steelhead runs and alternative commodities trans-

portation will greatly exceed the costs to the region and the Nation of keeping the dams in place. What was once the world's largest run of salmon is now the world's largest environmental recovery effort. This effort does not have to fail, nor does it have to result in economic catastrophe.

Of great concern to the Shoshone-Bannock Tribes is the failure of the Federal caucus to consult with the Shoshone-Bannock Tribes. The resources on the Fort Hall Indian Reservation are compromised by the actions of the Federal agencies, yet the Federal agencies have failed to address these impacts with the Shoshone-Bannock Tribes. Likewise, the Federal agencies have not consulted with the Shoshone-Bannock Tribes regarding the impacts to the fish resources that the Tribes rely upon off reservation. We remain hopeful that they will incorporate our comments when we submit them for their final documents. However, we are doubtful that they will because we have had many discussions with them and yet their conclusions and the words they have written in the drafts once again prove that they do not hear us.

Thank you subcommittee, and Chairman Crapo for hosting this hearing and providing us an opportunity to express ourselves. The Shoshone-Bannock Tribes technical staff, represented by Keith Kutchins, will provide testimony tomorrow.

STATEMENT OF JOHN ETCHART, REPRESENTING HON. MARC RACICOT, GOVERNOR, STATE OF MONTANA

Mr. Chairman and members of the subcommittee, thank you for the opportunity to testify today. My name is John Etchart, and I am here today on behalf of the Governor of Montana, Marc Racicot. For the past 7 years I have been one of Governor Racicot's appointees to the Northwest Power Planning Council.

As one of the four Pacific Northwest States, Montana has participated in the Federal Government's and the region's efforts to recover endangered salmon and resident fish in the Columbia River Basin. Montana is unique among the four States, however, because it does not now, and never did have, anadromous fish within its borders.

What Montana does have, Mr. Chairman, is water. Our two large storage reservoirs, Hungry Horse and Libby, have provided large blocks of water during critical times of the year to assist migrating salmon and steelhead in the lower portions of the Columbia River. Over 40 percent of the domestic storage utilized by the Federal Columbia River Power System is in Montana. So while we don't enjoy any of the economic, cultural and aesthetic benefits attributable to the salmon, we contribute in a very substantial way toward their recovery. I'll also add that this beneficence has not had the uniform support of the citizens of Montana.

Governor Racicot strongly believes that efforts to recover salmon and steelhead are a priority for the Pacific Northwest, including Montana, but also believes that the Governors of the four States, in conjunction with the Northwest Power Planning Council, should have more legal responsibility to develop and implement recovery plans for the listed species.

The capability and the commitment of the Governors was most recently illustrated by their recommendations for the protection and restoration of fish in the Columbia River Basin released in July. That document, which I would like to submit for the hearing record, is a comprehensive, no-nonsense package of recommendations that covers all the major areas of emphasis, including habitat reform, hatcheries, harvest, the hydroelectric system and the recognition that the impact on the region's people and our economic way of life comprises an important fifth "H."

Mr. Chairman, if you haven't done so already, I urge you to look at the Governors' recommendations when you have the opportunity. I think you will agree that the Governors were not afraid to take some bold stands on some of the thorniest issues we face. The National Marine Fisheries Service's draft biological opinion and "All-H" paper were not prepared with the benefit of the Governors' recommendations. This is a serious limitation because the Federal agencies have not included the region's input from our policy and political leaders. The Governors' input needs to be factored into the Federal agency documents before they are finalized. To that end, the Governors recently forwarded their work directly to Secretary Mineta.

Among the many recommendations included in the Governors' package, the following 10 common sense proposals are representative of the entire document.

1. The President should designate one official in the region to oversee the Federal recovery efforts, and who could serve as a single point of contact. There has been a clear lack of effort on the Federal agencies' part to collaborate with the States, tribes, local governments and landowners in recovery activities. This could be substantially corrected if the President were to do this.

2. The Federal agencies should develop a long-term management plan to address predation by fish-eating birds and marine mammals. So far, the Federal agencies have been unable to agree upon an approach to this problem.

3. The National Marine Fisheries Service should work with the region to conduct an intensive study on the impact of the ocean on fish recovery, including the impact of predation, lack of food sources, temperature problems and harvest regimes.

4. The use of spill should be improved—in duration, timing and quantity—at all Federal hydroelectric projects. This does not, in my view, call for more spill but rather that we gather the scientific information needed to better determine how best to balance the biological benefits of spilling water with the economic and system reliability impacts to the region's electric power system.

5. Flow augmentation should continue as a key mainstem strategy. However, the Federal agencies should document the benefits of flow augmentation and the precise attributes of flow that make it beneficial.

6. To reduce harvest impacts on listed fish, more selective fishing techniques and a license buyback program that can reduce the current excess fishing capacity should be instituted.

7. Harvest rates must ensure sufficient escapement to rebuild declining stocks. With inriver rates ranging up to 31 percent for one of the listed stocks, the Governors are not convinced that current practices are compatible with rapid recovery. Terminal fisheries should be established in appropriate areas.

8. Harvest goals must be linked to fish production goals. Hatchery operations must be modified so that fish are not being produced for fisheries where they cannot be harvested because of impacts on weak stocks.

9. Consistent with the Council's Artificial Production Review, the region's fish managers and tribes should jointly develop a comprehensive supplementation plan that includes aggressive monitoring and evaluation.

10. To facilitate a robust harvest program from hatchery fish in a way that does not impact wild fish, the Governors endorse a program that results in the marking of hatchery fish that pose threats to ESA-listed fish, to the fullest extent consistent with the Pacific Salmon Treaty.

Mr. Chairman, this is not to say that these recommendations are inconsistent with the draft biological opinion. The more important question is whether these recommendations will be pursued by the Federal agencies that wield authority under the Endangered Species Act. To my knowledge, the Governors' recommendations have not been acknowledged, let alone adopted, by the White House or the Federal agencies. This is unfortunate, especially when you consider that the electricity ratepayers of the Bonneville Power Administration finance the majority of salmon recovery measures instituted by the National Marine Fisheries Service. So while the region is required to pay for the implementation of the recovery measures, the region, historically, has had limited influence in determining the nature of those measures.

This leads me into one of Governor Racicot's primary concerns about the draft biological opinion. While the draft does appear to make a stronger effort to encourage collaboration with the Power Planning Council, the States, tribes, and others in the development of annual implementation plans, there is a lack of detail regarding the cost of the measures and whose responsibility it is to pay for them. Considering that a significant portion of the draft's "reasonable and prudent alternatives" deals with offsite mitigation measures, Governor Racicot presumes that the ratepayers once again will be asked to pay the freight.

What makes this even more troubling is the draft biological opinion's designation of "priority subbasins." Several of these high priority subbasins never have been emphasized by the Power Planning Council. For example, the Methow, Entiat, Cowlitz and Lewis subbasins in Washington State would evidently take priority for funding over other areas where the Council has historically concentrated significant resources and effort over the years.

When Congress passed the Northwest Power Act in 1980 and created the Northwest Power Planning Council, one of the primary responsibilities given the Council was to develop a fish and wildlife program to protect, mitigate and enhance all fish and wildlife in the Columbia River Basin affected by the hydroelectric system. As Montana understands the draft biological opinion, Congress' broad direction to protect all fish and wildlife in the Basin may take a back seat to focusing on ESA-listed stocks only. Such a development could have tragic consequences for many other at-risk species in the Basin.

Unfortunately, Congress does not oversee the implementation of Federal policy in the Columbia River Basin through its constitutionally derived "power of the purse." As a consequence, the funding of endangered species activities in the Columbia is a prime example of "backdoor" spending by a Federal agency, the National Marine Fisheries Service. Because Bonneville is a self-financing agency that doesn't require

annual appropriations for its operations, the National Marine Fisheries Service, through its ESA authority, is able to require Bonneville to pay for any number of measures in its biological opinions, regardless of whether they represent sound science and good public policy. Unfortunately, there is currently little opportunity for Congress to either approve or disapprove Bonneville's expenditures for ESA measures prior to their being made. Governor Racicot believes such a procedure on the part of the National Marine Fisheries Service circumvents the prerogative of Congress to approve agency budgets, as well as the public's right to accountability in the expenditure of public resources.

It is Governor Racicot's recommendation that the Fisheries Service be required to submit a specific, annual ESA budget for the Columbia River Basin, including activities proposed to be funded by the Bonneville ratepayers, to Congress for approval, just like other Federal agency activities. Ideally, ESA-specific measures, such as "reasonable and prudent alternatives" identified in the biological opinion, because of their national significance, should be financed through appropriations, not Bonneville ratepayer funds. This would ensure that Bonneville's funds would continue to be directed at the historic mission of protecting, mitigating and enhancing all fish and wildlife in the Basin affected by the hydrosystem. To the extent Bonneville funds are required to pay for measures in the biological opinions, Congress should demand the opportunity to review and approve them prior to the start of the fiscal year.

Montana is also concerned that the National Marine Fisheries Service's draft biological opinion does not include cost estimates for its proposed river and flow operations, and we are concerned about the potential impacts of these operations on reservoirs and resident fish and wildlife in our State. While water released in November primarily for the benefit of chum salmon in the lower Columbia River Basin would boost hydropower generation in that month, the region would lose 1,000 megawatts of generation in December and 1,500 megawatts in January as a result. This is precisely the time of year when the region faces the greatest risk of being unable to generate enough electricity to meet demand, according to an analysis done by our staff at the Power Planning Council. The cost of buying replacement power, if it is available, could be astronomical—as we learned from California's experience this past summer.

The reliability of the region's power system has clearly been degraded and for the first time since the 1970's there are increasingly frequent energy emergencies. These emergencies are of two types. First, as electric loads approach the limit of the region's generation capability, wholesale electricity prices become increasingly volatile. This summer's market volatility took wholesale electricity prices in the region to unprecedented levels of more than $1,000 per megawatt-hour. This compares with the price of Bonneville's power for public agencies in the region of approximately $23 per megawatt-hour. The second stage of a power emergency that could result from the current situation is curtailment of some loads followed by brownouts or blackouts! It is my view that the combination of events that define the region's power system reliability has reached a critical state where total system collapse could happen if we get an unusually cold and dry winter.

The impending regional power crisis is further exacerbated by the conflicting and overlapping authorities of the many Federal, State and tribal entities that make decisions concerning fish and wildlife requirements, power and flood control operations and marketing. The regional power reliability problems have at their root a public policy failure that fails to balance the biological and economic effects of proposed actions. An example of this occurred recently when Bonneville declared an energy emergency at the end of last month. Bonneville proposed to increase Federal generation and reduce fish requirements to avoid purchasing power from the competitive market at very high prices. The Federal agencies would not agree with Bonneville's proposal because it caused impacts on fish and recreation. So Bonneville was then forced to purchase power at prices in excess of $200 per megawatt-hour.

Bonneville recently reported to the Council that it spent approximately $45 million for purchased power in 1 week! This during a week when relatively few fish were in the river. This is an extremely large sum, and my point is that there is no Federal, regional or State decisionmaking mechanism to insure that an appropriate balance is struck between the various interests that have competing demands for the water stored in the region's reservoirs. The experience at the end of last month highlights the region's inability to decide on the best use of ratepayer funds and to establish a reasonable balance between the various interests that are all struggling to control the system to produce more of what they value most.

One last and specific example of the difficulty the region has finding balance is the impact that Montana must absorb as water is drafted in an attempt to improve the survival of juvenile salmon in the Lower Columbia River. The Federal storage

reservoirs in Montana house a productive ecosystem and critical habitat that supports our ESA-protected bull trout and other resident fish and wildlife. To improve on our management of these reservoirs and the benefits they provide, the Montana Department of Fish Wildlife and Parks has conducted years of research on the impacts of reservoir operations on these species. From this research we defined Integrated Rule Curves (IRCs), designed to provide water for power generation and salmon flows while preserving and protecting Montana's fish and wildlife species. The IRCs recognized the need for water downstream of Montana for other fish and other uses. However, we had to go to Federal court to secure even the weakest recognition by the Federal agencies of the needs of species in Montana, and to our consternation we find that the current draft biological opinion from NMFS again ignores biological needs of animals in Montana by recommending that even more water be taken from Hungry Horse dam.

On behalf of Governor Racicot, I want to thank you for offering me this opportunity to highlight some of the complex and controversial public policy questions that face our region. In our view, the present operation of the Federal hydropower system makes it nearly impossible to organize and direct a regional recovery effort and impossible to provide a rational balancing of the many competing multiple purpose interests in the Federal dams.

STATEMENT OF ERIC J. BLOCH, VICE CHAIRMAN, NORTHWEST POWER PLANNING COUNCIL AND REPRESENTATIVE OF HON. JOHN A. KITZHABER, GOVERNOR, STATE OF OREGON

Mr. Chairman, my name is Eric Bloch, and I am representing the Honorable John Kitzhaber, Governor of Oregon. I also am one of Governor Kitzhaber's two appointees to the Northwest Power Planning Council, and currently I am the Council's vice chairman. Thank you for the opportunity to testify today on fish and wildlife recovery efforts in the Pacific Northwest, and specifically on the draft biological opinion issued recently by the National Marine Fisheries Service.

I would like to begin by commending the general approach to recovery articulated in the Federal document, which I believe reflects the recognition that improvements in salmon survival must come through reducing mortality caused by hydrosystem operations, habitat degradation, harvesting and unscientific hatchery operations—the so-called "4 Hs". These key impacts on fish survival also are addressed in the recommendations for protection of Columbia River Basin fish, issued in July by the Governors of Oregon, Idaho, Montana and Washington.

The Governors' recommendations constituted a substantial and meaningful commitment toward ecosystem restoration, while accounting for the importance of maintaining a strong economy in the Pacific Northwest. The agreement was a clear recognition that, although at this time there is not political consensus among the four Northwest Governors on the fate of the Lower Snake River Dams, there is still much that can be done to restore the Columbia River ecosystem, while dam breaching remains a potential future action to be further evaluated for its biological benefits, economic impacts, and engineering feasibility. So the recommendations reflect agreement among the Governors about actions that can be taken immediately to help the fish.

In the context of today's hearing, these areas of agreement in the Governor's document are worth highlighting. For example, the Governors called for significant efforts to restore habitat, acquire habitat and water conversation from willing sellers, and increase Federal spending on incentives for private landowners to improve habitat voluntarily. The Governors support the full funding and implementation of the Lower Columbia River Basin Estuary Management Plan. They also recommended that fish harvest occur at levels commensurate with fish recovery and that fundamental changes be made in fish hatchery management and operation.

Finally, the Governors called for capital improvements at dams to improve fish passage and survival, consistent with their preference for natural river and biological processes.

Governor Kitzhaber hopes the Federal agencies will review the Governors' recommendations as part of the process of finalizing the draft biological opinion. In some instances, the Governors' recommendations are preferable to, and even more specific than, those in the biological opinion.

As I indicated at the outset, Governor Kitzhaber believes the overall "4–H" approach outlined in the draft biological opinions is commendable.

But after consideration of scientific analyses such as the State/Federal/tribal PATH (Plan for Analyzing and Testing Hypotheses) and the Northwest Power Planning Council's Ecosystem Diagnosis and Treatment model, and a thorough technical

review of the Biological Opinion, we believe the Biological Opinion generally underestimates the risk of extinction faced by salmon and steelhead in the Columbia/Snake basin listed as threatened or endangered under the Endangered Species Act (ESA). The Biological Opinion also generally underestimates the survival improvements needed to meet the ESA's legal requirement of insuring survival and recovery of the listed species.

To meet the legal mandate to insure both survival and recovery, the Federal documents must be strengthened to reflect the true extinction risk and necessary level of survival improvements. It is worth noting in this regard that Governor Kitzhaber believes the Northwest Governors' recommendations also must be strengthened so that they, too, more accurately reflect the extinction risk and more closely approximate the breadth and intensity of effort required for an effective basinwide recovery plan.

Thus, Oregon offers the following specific proposals to strengthen the draft Biological Opinion.

First, on-the-ground actions in each of the four "H's" must be made more robust by adding actions not included in the Federal documents and by increasing the intensity of some of the actions that are included.

Regarding hydropower operations, Governor Kitzhaber believes that the Federal proposal appears to rely too heavily on technological fixes and fish barging rather than on improving inriver conditions for fish migration. As I said earlier, this is in contrast to the four Governors' recommendations, which assert stronger support for hydrosystem configurations and operations that more closely resemble natural river processes, recognize barging as an interim strategy, and call for additional investment to improve river conditions so that more fish can migrate the river.

Specifically in the area of hydrosystem reform, we support:

• *Increasing spill at all projects.* Study after study has shown spill to be not only the most normative mode of downstream dam passage for migrating juvenile salmon, but also the mode with the highest survival rates.

• *Increasing flow augmentation.* At a minimum, the Federal Government should expeditiously purchase the 2 million acre feet of Canadian storage for Columbia River flows. For Snake River flows, the Federal Government should make the infrastructure changes at Owyhee Reservoir needed to access available storage there.

• *Continue to plan and, where necessary and appropriate, implement system reconfiguration improvements.* For the tributaries, this mean removal of economically marginal projects, such as is occurring with Marmot Dam on the Sandy River in Oregon, Condit Dam on the White Salmon River in Washington State, and the Wapotox Dam on Washington's Naches River.

For the mainstem Columbia and Snake River, this means continuing to assess drawdown options for John Day and other mainstem dams. It also means continuing to assess the biological benefits, economic costs, mitigation requirements and engineering feasibility of by-passing removal of the four dams on the Lower Snake River. It means timely planning and implementation to achieve Clean Water Act compliance at all the Federal projects.

To add to and make more robust existing harvest actions, we support decreasing the level of impacts on threatened and endangered stocks, while still affording a reasonable sport and commercial fishing opportunities to both Indian and non-Indian fishers. This can be accomplished by lowering the harvest rates, particularly for the fall fisheries that impact listed Snake River Fall Chinook, license buy-backs, creating terminal fishing opportunities off the mainstem areas, and utilizing more selective gear types.

Regarding habitat, we support the Federal Government channeling its support to the existing State, tribal and regional efforts currently underway that will result in improvements to salmon-related habitat. A principle example is the effort ongoing in Oregon, Washington and Idaho to greatly improve water quality in the tributaries and the mainstem.

We also support, in the area of habitat, establishing a mechanism and fund to purchase water and habitat rights on a willing seller/willing buyer basis, and more "user-friendly" assistance to private parties to such things as protecting riparian areas and conserving water.

In addition to these new and more robust actions, a second approach to making the Biological Opinion stronger is to improve the efficacy of the proposed monitoring and evaluation process. This could be accomplished by:

(1) Adjusting the timeframes for assessing compliance with established performance standards. The region should, frankly, be given less time than 5 years to get the required strategies and actions underway—more like 3 years seems appropriate, but should also, in all fairness, be given more like 10 years (at least two salmon

lifecycles) to demonstrate that the regional efforts are producing the desired increase in salmon survival.

(2) Departing from the "self-critique" approach to progress monitoring. Having agencies monitor and critique their own progress has not proved timely or credible in the past, and there is no reason to expect it would be any different under the current Biological Opinion. Instead, all monitoring and evaluation must be done by an independent body, and scientific peer review must be the rule, not the exception.

(3) Assuring that the consequences of failing to meet established objectives are credible and proportional. The Biological Opinion enumerates reinitiation of consultation and dam removal as the two consequences of failing to meet established performance standards. To both motivate action and fully inform the region, the Federal Government should enumerate consequences that are more credible and proportional. For example, if the region fails to achieve the requisite amount of riparian fencing, the consequences should involve taking other actions that will address the same temperature and sedimentation benefits that the riparian fencing would have otherwise provided.

Third, the means of collaboration with the region outlined in the Federal documents must be made far more explicit. At present, the recovery plan outlined in the Federal documents appears to rely upon regional collaboration, particularly with the Northwest Power Planning Council. But the collaboration exists on far too conceptual a level, given the importance of collaboration to achieving a plan that can be effectively and expeditiously implemented. Collaboration should occur in the following ways:

(1) Use Existing State and Tribal Salmon Improvement Efforts. The States and tribes of the region already have underway strategies and actions intended to benefit salmon, many of which are called for in the Federal documents. Development of TMDLs, efforts to enhance water monitoring capability, and working through local soil and water conservation districts and the Oregon Watershed Enhancement Board to increase enrollment in the Conservation Reserve Enhancement Program, are just three examples. These State and tribal actions have, to some extent, been hampered by a lack of support and collaboration from the Federal agencies. Providing support for these already-existing programs, activities and authorities would accomplish the goal of ecosystem health and fish and wildlife protection and recovery in the most efficient and effective manner.

(2) Provide Increased Technical and Financial Assistance to Private Citizens. There are private citizens all across this region who have been hard at work to restore wild salmon and steelhead to the Columbia Basin. Whether landowners changing their farming and ranching practices or fishers exploring new opportunities for more selective harvest, all need to receive greater assistance and true collaboration from the Federal Government. The Federal documents must specify how this needed change can be brought about.

Finally, as all four of the region's Governors clearly stated in their consensus recommendations, the recovery effort we face will be very costly. Without adequate funding, we will never restore the health of the Columbia Basin ecosystem and the salmon runs. To be credible, the recovery plan outlined in the Federal documents should provide a detailed budget and a funding strategy. Such a budget and funding strategy should include the following elements.

(1) Increase rate payer funding. The Bonneville Power Administration, which currently obligates up to $435 million per year in expenditures and foregone power system revenues, must provide more resources. The BPA Administrator has repeatedly indicated the rates being set for the 2002–2006 period give the agency the ability to meet this increased fish and wildlife funding obligation.

(2) Account for all existing fish and wildlife-related Federal appropriated funds. Many of the Federal departments and agencies currently receive funds that are earmarked for activities that, directly or indirectly, relate to restoration of ecosystem health and salmon populations in the Columbia Basin. This includes everything from NMFS' appropriations for ESA activities, to funds given to the U.S. Geological Service to monitor snow pack and run-off. To maximize the efficient and effective use of this existing funding, a summary accounting should be done.

(3) Remove barriers to best use of existing Federal appropriated funds. Barriers exist because of inter-agency "turf" concerns, as well as rules that are not "user friendly". An example of these problems can be seen in the CREP program, administered under the U.S. Department of Agriculture. A focussed effort must be made to identify and remove these barriers by making the administration of the fish and wildlife programs more streamlined, and the rules governing their use more flexible and goal oriented.

(4) Increase the Level of Appropriated Funds. The effort to restore the Columbia Basin ecosystem and restore salmon protects a national resource in satisfaction of

national obligations, such as the Endangered Species Act, the Clean Water Act, and Indian treaties. Therefore, appropriated funds are both proper and necessary to contribute to the regional recovery effort.

(5) Provide funds, in the short term, through a fiscal year 2001 Supplemental Appropriations, to be acted upon in early 2001, and the fiscal year 2002 Regular Appropriations Bill.

(6) Pursue new authority for a "Columbia–Snake River Regional Salmon Recovery Program". As was done with the Everglades and the California recovery effort known as Cal/Fed, this mechanism would provide for regular appropriations to the Federal agencies involved in the recovery effort, as well as direct and pass-through appropriations to Oregon, Washington, Idaho, Montana and other regional entities.

On these funding issues, we look forward to working closely with Congress and the Administration to insure that the opportunity to implement a recovery strategy that does not require removal of the four lower Snake River dams is not jeopardized by a lack of resources.

In conclusion, let me remind the committee of something that Governor Kitzhaber said in a speech he gave in Eugene last February to the Oregon chapter of the American Fisheries Society, "There is no doubt in my mind that we can move ahead with salmon recovery without breaching the dams. All I am saying to you today is that we have to stop deluding ourselves into believing that our choices will be easier and cheaper if we just leave the dams alone." What we have heard so far this morning, and will likely hear over the next 2 days of hearings, will generally bear out that prediction.

But we cannot shrink from this challenge of salmon restoration in the Columbia Basin. As Governor Kitzhaber has also noted on a number of occasions, unless we restore our degraded Columbia River Basin ecosystem, unless we find the way to utilize the bountiful resources of the Columbia in a sustainable fashion—sustainable ecologically, economically and socially—we will truly be mortgaging our children's futures.

Thank you again, Mr. Chairman for the opportunity to testify today.

STATEMENT OF FRANK L. CASSIDY, JR., CHAIRMAN, NORTHWEST POWER PLANNING COUNCIL

Mr. Chairman and members of the subcommittee, my name is Frank L. Cassidy, Jr., and I am chairman of the Northwest Power Planning Council. Today, I also am representing the Honorable Gary Locke, Governor of Washington.

The Power Planning Council is an agency of the States of Idaho, Montana, Oregon and Washington. Under the Northwest Power Act of 1980, the Council conducts long-range electric energy planning and analysis, and also prepares a program to protect, mitigate and enhance fish and wildlife of the Columbia River Basin that have been affected by hydropower dams.

The Council's Columbia River Basin Fish and Wildlife program directs the annual expenditure of about $130 million in electricity ratepayer funds to mitigate the impact of Federal hydropower dams in the Columbia River Basin on all fish and wildlife, including threatened and endangered species. With Snake River dam breaching off the table for at least 5 years, which coincidentally is the Council's statutory planning horizon, fish and wildlife recovery efforts in the Columbia River Basin will require undertakings and efforts with the dams in place. This means a strong emphasis on improving spawning and rearing habitat, changing hatchery and harvest practices to support rebuilding naturally spawning fish populations, and improving both smolt and adult fish passage survival throughout the basin, including at the dams.

These are key elements of the Council's Columbia River Basin Fish and Wildlife Program, which has been in effect since 1982, and they also are addressed in the fish recovery recommendations issued in July by the Governors of Idaho, Montana, Oregon and Washington. As a matter of record, and on behalf of the Power Planning Council, I would like to thank the Governors for their valuable contribution to the effort to devise regionally acceptable fish recovery plans. I hope the Federal action agencies will carefully review the Governors' recommendations in finalizing the draft biological opinions.

The Power Planning Council's Columbia River Basin Fish and Wildlife Program is the region's largest single effort to enhance fish and wildlife survival. Currently, the Council is amending the program with basinwide goals, biological objectives and action strategies, along with a scientific foundation of ecological principles. The basinwide goals and objectives will guide the Council's program, which will be implemented in the future primarily through locally-developed action plans.

More than at any time in the past, the Council's fish and wildlife program, which is the region's program, and the Federal recovery program for salmon and steelhead (the draft 2000 biological opinions and the so-called "All–H" paper) appear to be moving in the same direction. Both emphasize actions to improve fish spawning and rearing habitat, reform hatchery practices and give new direction to harvest policy and management. Both also leave the hydrosystem intact for the near-term and would direct actions to improve fish passage and survival at the dams and in the rivers.

We are pleased to see a strong role for the Power Planning Council in the Federal biological opinions and conceptual recovery plan, and we look forward to working with the Federal fish and wildlife agencies to improve the scientific credibility and the public accountability of the region's fish and wildlife recovery efforts.

The National Marine Fisheries Service's biological opinion places special emphasis on offsite habitat improvements (i.e., mitigating for hydrosystem impacts in areas located away from the hydrosystem) and calls for creating performance standards to guide habitat restoration. Again, this is consistent with the Council's direction in our fish and wildlife program, which relies on offsite mitigation as a means of addressing the impact of the hydropower system. This work has been under way for nearly 20 years through our program, and we welcome the Federal agencies' call for additional offsite mitigation to help avoid jeopardy and comply with the Endangered Species Act.

The Federal biological opinions call for reforming fish production facilities to minimize harm to fish that spawn in the wild, and also for using conservation and supplementation hatcheries to bolster weak populations and avoid extinction. The Federal documents recommend future fish hatchery policies and reforms be consistent with those recommended by the Power Planning Council in our report submitted to Congress last year on artificial production. We also intend to incorporate those recommendations and policies into our program as the basis for our future funding recommendations for artificial production facilities in the Columbia River Basin.

The Federal documents also propose several key reforms in fish harvest policies and management. First, the Federal agencies recommend selective fishing techniques and terminal fishing opportunities to reduce impacts on listed fish. These proposals are consistent with activities already funded through the Council's program, including the successful Select Area Fisheries Enhancement program that is creating commercial salmon fishing opportunities in Youngs Bay near Astoria, Oregon, and elsewhere in the lower Columbia River. The Federal agencies also propose actions to reduce fish harvest and, as a result, impacts on ESA-listed species. Again, these proposals are consistent with policy and direction in the Council's program and the draft program amendment.

The Federal action agencies propose to develop these habitat, hatchery and harvest actions through 1-year and 5-year implementation plans, focusing first on high-priority subbasins where there are listed species. We see an opportunity for the Council and the action agencies to work together in designing these plans, as the action agencies propose to rely on coordination and support from the Council in developing the implementation plans. The Council will provide this coordination and support through subbasin planning. In our draft fish and wildlife program amendment, we propose to implement our program primarily at the subbasin level through locally-developed subbasin action plans.

We see a number of opportunities in this cooperative planning effort, beyond simply clarifying who will take responsibility for actions in the Federal high-priority subbasins. The Council would have the opportunity to help frame the Federal action plans, and the Federal agencies would be able to participate in regional planning processes such as the Council's annual fish and wildlife project-funding review and recovery planning being undertaken by the States. This coordination would help avoid duplication among the processes and also encourage, and perhaps ensure, that the Federal, regional and State plans are consistent. For example, the action agencies plan to define their initial 5-year implementation plan by Jan. 31, 2001. Using this plan as guidance, the Federal agencies plan to participate in regional processes, such as the Council's review of projects funded through its fish and wildlife program. The agencies plan to complete their initial 1-year plan by September 1, 2001, about the same time the Council will recommend projects to Bonneville to implement the fish and wildlife program in fiscal year 2002.

The Council would, therefore, have the opportunity to ensure that its recommendations to Bonneville for project funding take into account the direction in the Federal agencies' 5-year and 1-year plans. Similarly, by participating in the Council's project review, the action agencies would be able to incorporate information from the Council's regional process into their implementation plan. Such collaboration by the region and the Federal agencies can only help ensure more effec-

tive efforts to protect, mitigate, enhance, and recover species in the Columbia River Basin.

As with subbasin plans that will implement the Council's program, there are benefits to implementing endangered species recovery through 1-year and 5-year action plans. The plans offer the opportunity to identify progress and actions needed to achieve hydrosystem and offsite habitat mitigation performance standards. The plans could integrate actions affecting hydrosystem operation, configuration, research and monitoring and evaluation. The plans could establish priorities to guide regional planning and inseason actions, and they also could support funding requests.

We note four areas where the biological opinions need further refinement:

First, the opinions are specific in the types of actions that are needed to avoid jeopardy, but they are general in describing where these actions are needed and in defining schedules for accomplishing them. More specificity is needed about which actions could be provided in the subbasin plans developed through the Council's planning process.

Second, the Federal documents call for improving stream flows—actions regarding water quantity and quality, and fish passage—but again are short on details. These need to be better articulated in the final documents.

Third, cost estimation is incomplete and needs much more detail. As I noted earlier, our staff analyzed the river flow operations proposed in the biological opinions and concluded they would reduce hydropower generation by 87 average megawatts. This would be in addition to hydropower operations in the 1995–98 biological opinion, which currently reduce hydropower generation by 1,152 average megawatts, at an estimated annual cost of $219 million in foregone power revenues and replacement power costs, compared to the amount that would be available if the system were operated only for power generation.

While 87 additional megawatts is a small amount of power at a relatively small annual cost (about $12 million to $15 million) compared to the output of the system and Bonneville's annual revenues, the problem we see is that the loss is not uniform through the year and, in fact, is quite large in winter months. For example, the additional flows that would be required to protect listed chum salmon in the lower Columbia River would boost hydropower generation in November by about 1,400 megawatts. However, releasing that much water in November would take away water from generation in December and January—1,000 megawatts in December and 1,500 in January—when we believe the power system will be stressed and most susceptible to reliability problems. In fact, in our recent study of the reliability of the regional power system we concluded the greatest risk—a 24 percent probability—of being unable to meet demand for electricity is in the winter months, particularly in January if there is an extended period of cold and dry weather. Thus we are concerned about the possibility of losing 1,500 megawatts of generation in January.

Regardless of whether these or other new hydrosystem operations are included in the final biological opinion, the Council's mission under the Northwest Power Act to protect, mitigate and enhance fish and wildlife while assuring the Northwest an adequate, efficient, economical and reliable power supply makes clear our responsibility: to identify other sources of power—a combination of renewable resources and distributed generation, for example—and energy conservation and other means of reducing demand for power, in order to provide equitable treatment for fish and wildlife with other purposes of the hydropower system.

Protocols should be established, if they are not already, for Bonneville to decide when, and under what conditions, spill required under the biological opinion would be curtailed in order to boost hydropower generation. Decisions to reduce spill, which could harm migrating juvenile anadromous fish, or to continue spilling when demand for power is high, need to be based on clear protocols and be clearly articulated for the public.

Fourth, the biological opinions designate priority subbasins for actions to assist endangered and threatened species, but do not specify how these actions would be funded. Because the Council's fish and wildlife program is designed to benefit all fish and wildlife in the basin, including listed species, we have been addressing listed species through a number of actions in the program for years. A significant portion of the approximate $130 million annual budget for the direct program over the last 5 years has benefited species of concern under the Endangered Species Act. In fact, the 1996 Memorandum of Agreement between the Clinton Administration, the Council and Columbia Basin Indian tribes, which established Bonneville's fish and wildlife budget for the 1996–2002 time period, also set aside about $30 million in Bonneville funding to pay for measures that might be required by the 1995–1998 Biological Opinion. Today, about $2.5 million remains.

However, we are concerned that Bonneville might be called on to fund additional measures in the high-priority subbasins in order to comply with the 2000 biological opinions, thus taking funding away from efforts to mitigate the impact of the hydropower system on fish and wildlife elsewhere in the Columbia River Basin. Two of the high-priority subbasins are downstream of Bonneville Dam. In the past, the Council's program has contained few measures downstream of Bonneville Dam, other than in the Willamette River Basin, because the majority of hydropower impacts are above Bonneville. For Fiscal Year 2001, the Columbia Basin Fish and Wildlife Authority (CBFWA), which represents the region's State, Federal and tribal fish and wildlife managers, has identified nearly $140 million in projects for funding through the Council's program. If the Council were to follow CBFWA's recommendations, there would be little if any room in Bonneville's budget to finance activities in the biological opinions. For that reason, we believe that the Administration should prepare and submit for Congress' consideration a supplemental appropriations request for Fiscal Year 2001 for actions that address the reasonable and prudent alternatives proposed in the draft biological opinions, particularly those proposed for lower-Columbia listed species.

In my testimony, Mr. Chairman, I have pointed out some of the similarities between the draft biological opinions and the Council's draft amended fish and wildlife program. The draft program amendment constitutes a major change in the way we fulfill our mandate under the Northwest Power Act to protect, mitigate and enhance fish and wildlife of the Columbia River Basin that have been affected by hydropower.

Unlike past versions of the program, which were criticized by independent scientists for consisting primarily of a number of measures that called for specific actions without a clear, programwide foundation of scientific principles, the new program will express goals and objectives for the entire Columbia River Basin based on a scientific foundation of ecological principles. Currently, we are amending the program with basinwide goals, biological objectives, and strategies to achieve the objectives and a scientific foundation. We expect to complete this phase of the rulemaking in October. Then we will begin developing subbasin action plans for each of the 53 subbasins of the Columbia, which are arrayed within 11 geographic provinces. These plans, which will be developed locally, will be consistent with the goals and objectives for the basin—thus, the goals and objectives we are developing now will guide the development and implementation of the subbasin plans. As I noted earlier, this provides an opportunity for the Federal action agencies to participate in developing the plans so that the region has a consistent approach to species recovery.

The Council believes this unique program structure, goal-oriented and science-based, will result in a more carefully focused, scientifically credible and publicly accountable program that will direct the region's substantial fish and wildlife investment to the places and species where it will do the most good.

It is an action-focused plan, as are the Federal agency biological opinions. In addition to emphasizing locally-developed action plans, the Council proposes to create either a trust or a separate fund for habitat and water acquisitions in recognition of the habitat-restoration focus of our program. We also propose to establish criteria for "early action projects"—those with a demonstrated need to move more quickly than the normal planning procedures would allow.

The Council's draft amended fish and wildlife program addresses all of the "Hs" of impacts on fish and wildlife—habitat, hatcheries, harvest and hydropower:

- Primarily, it is a habitat-based program, directing significant attention to rebuilding healthy, naturally producing fish and wildlife populations by protecting and restoring habitats and the biological systems within them.
- The draft requires that fish hatcheries funded by Bonneville operate consistent with reforms recommended to Congress by the Council last year, reforms that would shift hatchery production away from a primary focus on providing fish for harvest to also providing fish to rebuild naturally spawning populations.
- The draft amendment will assure that subbasin plans are consistent with harvest management practices and will increase opportunities for harvest wherever feasible, while at the same time avoiding interceptions of threatened and endangered species whenever possible.
- The draft program amendment focuses on providing conditions in the Columbia River Basin hydroelectric system that most closely approximate natural physical and biological conditions with the dams in place.

To conclude, Mr. Chairman, the Council is proposing a fundamentally new management style for our fish and wildlife program, one that focuses on locally-developed action plans with clearly stated goals and objectives that are consistent with goals and objectives for the entire Columbia River Basin. Our program will articu-

late a scientific foundation for action, and we will continue to submit each project proposed for funding through our program to review by a panel of independent scientists as required by the Northwest Power Act. We will reform hatchery practices for those facilities funded through our program, and we will work to integrate harvest into our planning so that harvest and hatchery policies and practices do not work at cross purposes—raising fish for harvest that cannot be caught because of harvest restrictions imposed to protect threatened and endangered species. We also will continue to account for ocean conditions in our decisionmaking, and we will work to improve data collection and management and project monitoring and evaluation so that we, and others in the region, can gain a better understanding of what is working, what is not working and what might be done to improve our efforts.

All of these elements are part of a recovery and mitigation effort that we look forward to pursuing in collaboration with the Federal action agencies through locally-developed action plans. Ultimately, this collaboration will improve the public accountability and scientific credibility of all our efforts.

Thank you again, Mr. Chairman, for the opportunity to speak today. I would be pleased to answer any questions.

STATEMENT OF WILLIAM STELLE, JR., REGIONAL ADMINISTRATOR, NATIONAL MARINE FISHERIES SERVICE, NORTHWEST REGION

INTRODUCTION

Thank you, Mr. Chairman, and members of the subcommittee. I appreciate the opportunity to be here today, and I commend the subcommittee for taking the time to examine the complex choices facing the Northwest region regarding salmon recovery in the Columbia Basin.

The National Marine Fisheries Service (NOAA Fisheries) is engaged in two efforts at present to address salmon recovery policy as it applies for the Federal Columbia River Power System (FCRPS). One is a new biological opinion covering operations and configuration of the system under the Endangered Species Act (ESA). The other is a Basin-wide Recovery Strategy, a conceptual recovery plan for all the listed salmon stocks in the Columbia and Snake River basins.

I testified before this panel in April of this year, and my written statement at that time described the overall approach being taken by NOAA Fisheries in cooperation with affected Federal, State and tribal agencies. My testimony today will serve to update you on these efforts.

STOCK STATUS

NOAA Fisheries scientists continue to update and adjust their assessments of the current status of the stocks and the prognosis for those stocks over the short and long term. While we fine-tune those analyses, the basic story remains the same: Stocks throughout the Columbia Basin remain in deep trouble, with the Upper Columbia chinook, Snake River chinook and steelhead stocks throughout the Basin most at peril.

THE BIOLOGICAL OPINION

Section 7 of the Endangered Species Act requires Federal agencies to consult with the Secretary of Commerce to ensure that its actions are not likely to jeopardize the continued existence of threatened or endangered salmon and steelhead, or their habitats. To inform this consultation, the so-called "action" agencies must conduct a biological assessment (BA) of their prospective actions to determine the likely impact of such actions on listed species. The BA forms the basis of inter-agency consultation under ESA and the subsequent Biological Opinion (BO) rendered by NOAA Fisheries.

On December 22, 1999, NOAA Fisheries received a BA from Bonneville Power Administration, the U.S. Army Corps of Engineers, and the Bureau of Reclamation outlining proposed operation and configuration of the FCRPS and assessing the likely impacts on listed salmon and other fish and wildlife species. We have now developed a new draft BO for the system to replace the one completed in 1995.

The scope of the new draft BO covers the entire FCRPS and all 12 Evolutionarily Significant Units (ESUs) within the Columbia Basin. It addresses operation of the system, including flow and spill. It addresses system configuration, including a dam drawdown decision, passage improvements at each project and operation of the transportation system. It evaluates performance standards for the hydrosystem based upon productivity improvements needed by each listed ESU to avoid extinction and achieve a recovery trajectory.

Our jeopardy standard is the same as it was in 1995, but is applied to additional at-risk populations.

NOAA Fisheries and the Action Agencies have been working in an inter-agency group since Fall 1999. That group is composed of senior staff from each agency. In addition, on January 26, 2000, NOAA Fisheries sent a letter to each of the Northwest States and 13 Native American tribes inviting them to participate in the consultation process. Since then, the work group has been meeting regularly, both by itself and with the States and tribes, to lay the groundwork for, and develop the key elements of, a new BO covering future operations of the FCRPS. Draft materials developed through the Federal work group process have been shared with same States and tribes, including hydrologic and biological analyses of the effects of certain flow and spill alternatives, an analysis of the potential effects of those same operations on the transmission system, and an initial description of the information being developed to assist in the evaluation and use of performance standards.

There have been numerous work group meetings for interagency consultation, and there have also been a number of meetings between the work group and the affected States and tribes. These were the meetings during which the key technical elements of the biological opinion were developed, analyzed, discussed, and refined. In short, this was where the real work was done. We have endeavored to make this process as open as possible by making technical documents and schedule information widely available, and by inviting State and tribal governments to participate.

NOAA Fisheries has submitted the draft BO to the States and tribes for technical review and comment. This is not a formal public review process. The point of the review by States and tribes with technical expertise in this area is to ensure that NOAA Fisheries is including and appropriately applying the best available scientific information. The Opinion will be revised based on this input.

We had hoped to release the BO sooner, but there were several reasons for the delay we experienced. First and foremost, we wanted to be certain our analysis was complete. The biology was a major factor informing our decision, and we wanted to make sure it could withstand independent review. Second, we applied a new tool in our efforts to rebuild salmon and steelhead populations: performance standards. We think it is critical that we have an effective tool for setting goals and measuring progress. Performance standards have tremendous promise in this regard, but the technical challenge in applying them to the salmon life cycle is extremely rigorous and time consuming. Finally, there were considerable logistical demands associated with conducting public hearings on the All–H Paper (which we are now calling the Basin-wide Recovery Strategy) and consulting with 13 tribes.

THE BASIN-WIDE RECOVERY STRATEGY

NOAA Fisheries and the other Federal agencies continue their work on a comprehensive response to the status of these stocks through the development of a Basin-wide Recovery Strategy—a collection of concepts that will guide recovery planning for all the stocks in the Basin that is often referred to as the "All H's Paper." We released the draft Basin-wide Recovery Strategy with the draft biological opinion governing the operation of the Columbia River Federal hydropower system.

The Basin-wide Recovery Strategy emphasizes that overhaul of the situation in the Columbia Basin must be comprehensive to be effective and is not limited to hydropower issues alone. The Basin-wide Recovery Strategy therefore recommends a comprehensive basin-wide program that places a premium on actions that can be implemented quickly, that are likely to provide solid and predictable benefits, and that will benefit the broadest range of species. These include conservation hatchery interventions, production hatchery reforms, improvements on Federal lands, instream flows for de-watered streams, elimination of impediments to passage in the tributaries, continued improvements to passage at the mainstem dams and rebuilding the productivity of the estuary.

The Basin-wide Recovery Strategy is built on biological considerations, but also recognizes there is a limit to the resources available for the job and to the authority of Federal agencies. It also emphasizes Federal support for actions that State and local governments are planning or already undertaking, such as the Northwest Power Planning Council's sub-basin planning proposal. In the habitat arena, where some actions can take decades to show benefits, the program emphasizes those measures that can be taken quickly, with longer term actions to be taken later based on sub-basin assessments and plans. It also seeks to establish strong connections between the new habitat features of the Council's fish program and the related State programs in the same subject area, such as water quality protections, instream flows and riparian-related activities.

The Federal agencies also recognize that, even while the region has devoted considerable resources to restoring Columbia Basin fish, there are limits to those resources. The combination of near-term biological risks and resource limitations led the agencies to focus on actions that give the greatest "bang for the buck"—that have predictable benefits, that will benefit the greatest number of species. Getting the biggest bang for the buck can mean focusing on those life stages where improvements will yield the biggest results, or on those actions that are more certain to result in improvements in a short timeframe.

For example, scientific analysis suggests that improving survival during the first year of life, when the greatest mortality occurs, will give the greatest benefit. This emphasizes, in particular, the value of improving freshwater habitat. Scientific analysis also suggests improvements in all life stages will have a greater effect on overall productivity than focusing improvements on just one life stage. In other words, a comprehensive approach to improve survival throughout the salmon's life cycle will be a more effective strategy than a singular focus on one life stage (or H). In summary, we believe getting the biggest bang for the buck means making difficult choices on how available resources are allocated, now and into the future, focusing on actions that benefit a large number of ESUs. For example, improvements in dam passage in the lower Columbia benefit all upriver ESUs, and improvements in the estuary benefit all 12 ESUs to varying degrees.

Federal agencies also considered tribal trust responsibilities in developing this package. For some ESUs, such as Snake River fall chinook, eliminating harvest would reduce substantially the risk of extinction. Dramatically reducing hatchery production basin-wide would also benefit all ESUs to some degree, although it is not possible to quantify the benefit with precision. The Basin-wide Recovery Strategy does not recommend these actions, however, because of the importance of maintaining some level of tribal harvest. Instead, we call for a major effort to implement a complete overhaul of the hatchery system in the Basin to reduce the ongoing risks to the weak wild stocks posed by the existing system. The Strategy calls for a major effort to monitor and evaluate the success of this overhaul and reduce the uncertainties that now abound.

I would like to take a moment to speak to the general issue of uncertainty and the NOAA Fisheries response to it. We must understand that we face unavoidable uncertainties as we craft this next phase of the recovery effort. Uncertainty pervades our ability to count wild fish and estimate the size and trends in the populations because we have not distinguished between wild spawners and their hatchery counterparts when counting fish in the past. Hence our current projections of the size of those populations must be caveated. Uncertainty pervades the ability to estimate the scope and degree of impacts—both positive and negative—associated with the Columbia Basin industrial-scale hatchery system for the simple reason that we have not bothered to make a priority to invest in the research to characterize those impacts. Uncertainty pervades our ability to estimate the existing habitat base and its potential to improve salmon productivity. While we have made some progress in understanding the basic ecology of freshwater systems, we remain ignorant of the ecology of the estuarine or marine environments which are so vital to the long-term health of these very salmon populations we are endeavoring to recover.

We must squarely confront these uncertainties as we work to identify the best opportunities to secure survival improvements, quantify how much improvement is enough, and assess whether a particular menu of actions will likely produce the desired amount. In the Basin-wide Recovery Strategy we place a significant emphasis on a comprehensive monitoring and evaluation program to generate better information about what will work best so that we will be able to make adjustments in the days and years to come. This work covers the key uncertainties enumerated above, and we commit to its peer review as we proceed. In short, uncertainty becomes a call to action and not an excuse for inaction or capitulation.

Much of the regional debate has focused on removal of Snake River dams. There is continuing scientific uncertainty about whether breaching dams is necessary to achieve recovery and considerable uncertainty about whether it will do the job. Only Snake River fish benefit from breaching, with no benefit to eight other listed populations. Dam removal would require explicit congressional authorization, and, once authorized, cannot be implemented on a short timeframe. Its high cost may prejudice other actions needed throughout the Basin. The option of Snake River drawdown therefore appears to rank as a lower priority at this time than other available options because of the long time to implement, narrow benefits, biological uncertainties and high costs.

Instead, the current analysis indicates that an aggressive and comprehensive approach will provide immediate benefits and lay the foundation for salmon and

steelhead recovery. We expect to challenge hydropower system operators now to meet rigorous survival goals over the next 10 years, using continued improvements in flow and spill management and structural improvements at dams. Progress would be reviewed in 5 years, and system performance would be evaluated against performance standards in 5, 8, and 10 years. Dam removal would again be addressed if progress toward these goals is inadequate or if called for by new scientific information about the Snake River stocks.

NOAA Fisheries and the Federal agencies are working to develop a program that commits the region to implement habitat, harvest and hatchery actions to further enhance fish survival beyond that achieved with their investments in the hydropower system.

Such a program would call for a major effort at improving the health of the stream systems, the mainstem habitats and the estuary, all of which are important building blocks for recovery. The program would ground the restoration strategies on a combination of scientific assessments through the Council's program and sensible "early actions" to jump start rebuilding. Putting water back into de-watered streams and opening up access to healthy habitat may be a good place start.

Finally, the program would call for the development and implementation of an aggressive, unprecedented monitoring and evaluation program that will enable the agencies to assess program results as well as to resolve critical uncertainties. Further, this contemplates rigorous independent peer review of its scientific foundation and the implications of the monitoring and evaluation activities.

Mr. Chairman, that concludes my statement. I would welcome the opportunity to respond to questions.

STATEMENT OF COL. ERIC T. MOGREN, DEPARTMENT OF THE ARMY, U.S. ARMY CORPS OF ENGINEERS, NORTHWESTERN DIVISION

INTRODUCTION

Mr. Chairman and members of the subcommittee, I am Colonel Eric Mogren, Deputy Division Engineer, Northwestern Division, U.S. Army Corps of Engineers. I am testifying on behalf of the Honorable Dr. Joseph W. Westphal, Assistant Secretary of the Army for Civil Works. Thank you for this opportunity to discuss the status of the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) Biological Opinions on operations of the Federal Columbia River Power System.

BACKGROUND

The Corps constructed and operates 12 major dams in the Columbia River Basin that affect the habitat and migration of anadromous salmon and steelhead, Kootenai River white sturgeon, and bull trout—all listed under the Endangered Species Act (ESA). The dams are authorized under project authorities in the Rivers and Harbors Acts of 1935, 1945, 1946, 1950, and 1962 for multiple uses including flood control, power production, navigation, recreation, fish and wildlife, irrigation and municipal and industrial water supply.

Bonneville, the Dalles, John Day and McNary dams on the lower Columbia River and Ice Harbor, Lower Monumental, Little Goose and Lower Granite dams on the lower Snake River are in the migratory path of several species of salmon and steelhead. Two upstream storage dams operated by the Corps—Dworshak in Idaho and Libby in Montana—contribute to salmon restoration actions through flow augmentation. Operations of Dworshak, Libby and Albeni Falls, a multipurpose project on the Pend Oreille River in Idaho, also affect white sturgeon and bull trout habitat. The twelfth dam is Chief Joseph in the mid-Columbia River.

The Corps Northwestern Division office in Portland and the Walla Walla, Portland and Seattle District offices are involved in efforts to improve conditions for ESA listed aquatic species throughout the Columbia River Basin.

ENDANGERED SPECIES ACT/BIOLOGICAL OPINIONS

Although Columbia River Basin returns of adult salmon and steelhead have been the strongest this year in several decades, overall many Columbia River Basin fish stocks are in decline. In 1991, NMFS listed the Snake River sockeye salmon as endangered under the ESA. In 1992, the Snake River spring/summer and fall chinook salmon were listed as threatened. USFWS has listed two species of resident fish in the basin—Kootenai River white sturgeon in September 1994, and bull trout in June 1998. Over the last several years, nine more Columbia and Snake River salmon and

steelhead stocks have been listed under the ESA, bringing the total to 12 listed salmon and steelhead stocks within the basin.

No single factor is solely responsible for the decline of the salmon, and it will require efforts across all life cycle influences to restore listed stocks. Recovery efforts must address the following four life cycle areas, referred to as the All–H's: harvest, habitat, hatcheries, and the hydropower system. The Corps' primary role in recovery efforts is to implement measures at its dams and reservoirs to assist recovery of salmon and steelhead and other listed fish populations.

The salmon, steelhead, bull trout and sturgeon ESA listings triggered the requirement for Federal agencies to consult with NMFS and USFWS on hydro-system operations and configuration affecting the listed species. Formal consultation begins with a Biological Assessment from the "action" agencies, i.e., the Corps, Bonneville Power Administration (BPA) and the Bureau of Reclamation (BoR), and culminates in hydropower Biological Opinions from the ESA regulatory agencies. The action agencies are currently operating under 1995 Biological Opinions from NMFS and USFWS and 1998 and 2000 Supplemental Biological Opinions to address additional salmon and steelhead species listed since 1995. The Opinions contain measures to avoid jeopardizing the continued existence of listed salmon, steelhead and white sturgeon species and to avoid adversely modifying designated critical habitat.

The action agencies transmitted a new Biological Assessment to NMFS and USFWS in December 1999, because the current Biological Opinions were written pending results of long-term studies. The 1999 Biological Assessment addresses proposed operation and identifies studies for long-term configuration of the Federal Columbia River Power System (FCRPS). The Biological Assessment incorporates measures that were put into place under the 1995 NMFS and USFWS Biological Opinions, a 1998 supplemental, a 1999 Biological Assessment on listed bull trout and sturgeon, and a 1999 draft Biological Opinion pertaining to listed Columbia River chum salmon. Both near- and long-term actions intended to improve fish passage are identified.

Near-term actions include:

• Flow augmentation—Release of water from storage or headwater reservoirs to meet flow targets in the lower river for salmon and steelhead.

• Reservoir operations—Operations of headwater projects to provide for spawning and recruitment of Kootenai River white sturgeon, and minimize rapid fluctuation in both reservoirs and unimpounded river reaches for improved bull trout habitat conditions; and release of water from Dworshak Dam for temperature control.

• Spill measures—Water passed at a dam through a spillway rather than being sent through the turbines to guide fish away from the turbines, thereby reducing the percentage of turbine-related mortality.

• Fish transportation—Juvenile salmon and steelhead collected at dam sites on the lower Snake and Columbia rivers and placed in specially designed barges to be transported down river and released below Bonneville Dam.

• Predator control programs—Programs intended to help protect juvenile salmon from other species that prey on them, such as northern pikeminnow and Caspian terns.

Long-term actions in the Biological Assessment include:

• Lower Snake River survival improvement study—complete feasibility level study to analyze alternatives for long-term configuration and operation of the lower Snake River dams, including breaching.

• Water quality—planned and ongoing studies intended to improve dissolved gas and temperature conditions.

• Passage improvements—continue turbine studies to identify operational and structural modifications to make turbine passage less harmful to fish; testing of surface collectors; bypass improvements; and additional fish transport facilities.

STATUS OF BIOLOGICAL OPINION

Consultations triggered by the 1999 Biological Assessment are ongoing with NMFS and USFWS and the three action agencies—the Corps, BPA and BoR. We are currently reviewing the draft Biological Opinions released July 27, 2000, for 60-day Federal agency, State and Tribal review. Consultations are addressing long-term operations and configuration of the FCRPS needed to ensure survival of the listed stocks throughout the Columbia River Basin. There are still some measures to be worked further for the final Biological Opinions; however, we believe that we can reach agreement on most major issues and overall direction. We anticipate that a series of performance measures and standards will allow us to judge the success of our efforts. The measures in the Biological Opinion and the All–H Paper continue

to reflect the need to look beyond the hydrosystem and take into account actions in all the life-cycle areas.

Consultations on the draft NMFS Biological Opinion are addressing several major operational and configuration issues, including future configuration of four Snake River dams, study of potential flood control modifications, and water quality.

The NMFS July 27, 2000, draft Biological Opinion does not call for immediate breach of the Lower Snake River dams. Rather, the draft calls for aggressive actions in the FCRPS to be taken over the next 10 years. It contains performance measures to be met, with check-ins at certain points during the 10-year period. If performance measures are not met, or if listed stocks experience dangerous declines, the agencies would again consider the question of more drastic measures, such as dam breach, within the context of actions for all listed salmon and steelhead stocks throughout the basin. The Corps supports this approach as long as actions across all H's are considered equally; performance standards and milestones are realistic; there is an aggressive monitoring and evaluation program to gauge performance; and, if the jeopardy standards are not met after the specified period, other hydro and non-hydroactions would be considered in a reconsultation process. To minimize startup delay in the event of a lower Snake River dam breach decision in the future, we continue to work with NMFS on the timing and appropriate level of effort for engineering and economic mitigation evaluation.

Current operations of Corps storage reservoirs are conducted to provide adequate flood control protection. The draft Biological Opinion calls upon the Corps to conduct a detailed, system wide, multi-year study of flood control limits to determine whether flexibility exists for providing additional fish flows by reducing the amount of flood control storage required. We consider this to be a major undertaking, and, if included in the final Biological Opinion, we would seek appropriate congressional approval to begin this study.

The NMFS draft Biological Opinion also specifies measures the Corps, BoR and BPA could take to preserve and restore habitat in the Columbia River estuary, in tributaries, and in mainstem areas to further improve the survival and recovery of listed species in critical spawning, rearing and estuary stages. We strongly support these actions as part of an All–H approach to species restoration. The Opinion also continues to support evaluation of surface bypass systems for juvenile fish, turbine passage improvements testing, and other advancements in fish passage technology.

The draft USFWS Biological Opinion requests adjustments to the operations and ramping rates at Albeni Falls and Libby Dam to balance needs of listed resident fish (Kootenai River white sturgeon and bull trout). In addition, USFWS is asking the Corps to continue for the next 6 years a study of alternative pool elevations at Albeni Falls to increase Kokanee spawning for bull trout food source. This would affect NMFS operations for salmon. The draft USFWS Biological Opinion also addresses actions at Libby Dam to allow increased flows to achieve flow objectives for sturgeon, while controlling additional total dissolved gas. Several operational measures in the draft Biological Opinions would require coordination with Canada.

FEDERAL CAUCUS AND BASIN-WIDE RECOVERY STRATEGY

Actions for fish in the hydropower system must be considered in the broader context of the entire Columbia River Basin, for multiple species, and across the salmon life-cycle influences. To provide this broader context, a Federal Caucus is developing a basin-wide strategy for recovery of Columbia River Basin fish. The Federal Caucus includes representatives from NMFS, USFWS, BoR, Bureau of Indian Affairs, Bureau of Land Management, the Environmental Protection Agency, BPA, U.S. Forest Service, and the Corps.

In December 1999, the Federal Caucus released a draft "All–H Paper," which laid out options for action in the areas of hydropower, harvest, hatchery management, and habitat improvements to be integrated into a comprehensive strategy for recovery of the listed species. Those options were grouped into the following four alternatives in the draft All–H Paper for the purpose of stimulating public discussion:

(A) Dam Removal—breach four lower Snake River dams;

(B) Harvest Constraints—retain the lower Snake River dams, limit salmon harvest, improve habitat, and improve conditions in the hydropower system;

(C) Aggressive Non-Breach—defer decision on breaching lower Snake River dams, aggressive actions in other H's; and

(D) Maximum Protections—breach lower Snake River dams, aggressive actions in other H's.

The All–H Basinwide Strategy is meant to provide a framework for recovery actions. It is a common Federal approach to look at all aspects of life cycles in a comprehensive manner. This has created a context and a common operating concept for

Federal agencies to work with the States and Tribes, to coordinate and collaborate on technical and policy decisions for Columbia Basin fish recovery. The Federal agencies have begun a joint consultation with the 13 Columbia River tribes framed around the All-H Paper as a basis for constructive discussion.

Following a public comment period and series of public meetings on the draft All–H Paper, the Federal Caucus prepared a revised paper which was released for public review on July 27 concurrently with the draft Biological Opinions. This paper identifies a preferred strategy of aggressive actions across all life-cycle H's, with a deferred decision on dam breaching.

LOWER SNAKE RIVER STUDY

The question of whether to breach four lower Snake River dams has been a focus in regional discussions concerning recovery of Columbia Basin stocks, even though such an action would have direct influence on the recovery of only 4 of the listed 12 salmon and steelhead stocks in the basin. The Corps of Engineers Lower Snake River Juvenile Salmon Migration Feasibility Study includes evaluation of such an action. This study was initiated in response to the reasonable and prudent alternative in the 1995 and later NMFS Biological Opinions to evaluate long-term alternatives for the four lower Snake River dams.

The primary objective of the lower Snake River study is to develop a plan to improve migration conditions for salmon and steelhead in the lower Snake River and to contribute to the recovery of these stocks. This study addresses the four lower Snake River dams—Ice Harbor, Lower Monumental, Little Goose, and Lower Granite. It does not address specific actions on dams and reservoirs on the Columbia River, or other factors in salmon decline besides operation of these projects. The geographical scope is the lower Snake River, from its confluence with the Columbia River extending upstream approximately 140 miles to the city of Lewiston, ID.

The study examines the following four major alternatives for the lower Snake River dams:

(1) maintain the existing fish passage system with current and planned improvements;

(2) maximize transportation of juvenile fish;

(3) make major system improvements such as surface bypass, gas abatement measures, and turbine passage improvements; and

(4) implement permanent natural river drawdown by breaching the dams.

In December 1999, the Corps released a draft Environmental Impact Statement (EIS) on these alternatives for public review. In order to allow all affected parties in the region to address the issues within the broader context of other ongoing regional efforts for Columbia River Basin fish, a preferred alternative was not identified in the draft EIS. In conjunction with the Federal Caucus, the Corps held 15 public meetings in February and March 2000 throughout the region (Oregon, Idaho, Washington, Montana, and Alaska).

The Corps continues to progress toward a final EIS. The Corps is now processing the considerable volume of comments received and is analyzing the substantive issues raised. At this point in the evaluation, all four alternatives are still under consideration. The measures called for in the draft/final Biological Opinions will be a factor in the Corps' choice of a preferred alternative in the final EIS. We anticipate that we will have a final EIS with a preferred alternative identified in March 2001. If the recommendations in the final EIS and Record of Decision include dam breaching, congressional authorization and appropriations would be sought.

CLOSING

The successful conclusion of the Biological Opinion consultations and the integration of the Biological Opinions and the All–H Paper depend upon the continued coordination and cooperation of the Federal agencies. We are making good progress. The agencies, of course, have different and sometimes conflicting views, but we are all committed to restoring the many stocks of listed Columbia River Basin fish. We look to the Congress for continued support of these efforts and will continue to work with you and keep the lines of communication open.

Mr. Chairman, this concludes my testimony. I would be happy to answer any questions.

STATEMENT OF JUDITH A. JOHANSEN, ADMINISTRATOR AND CHIEF EXECUTIVE OFFICER, BONNEVILLE POWER ADMINISTRATION, U.S. DEPARTMENT OF ENERGY

Mr. Chairman, distinguished members of the committee, my name is Judi Johansen. I am the administrator and chief executive officer of the Bonneville Power Administration (Bonneville). We appreciate this opportunity to appear today. We also appreciate your and the committee's continued support and attention to Columbia River Basin fish and wildlife.

Bonneville is committed to working with the region on a comprehensive plan for recovering Columbia and Snake River salmon, steelhead, and resident fish. This is a considerable challenge, a work still in progress. It requires agreement on common strategies and actions among Federal, State, and tribal governments. It also requires concerted effort and partnerships with many different parties in the basin, some with differing interests and objectives.

Important decisions for fish recovery are coming together now. The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) recently issued draft Biological Opinions on long-term operation of the Federal Columbia River Power System (FCRPS) to avoid jeopardy to listed salmon, steelhead, sturgeon and bull trout. At the same time, nine Federal management agencies, including Bonneville, released another draft of the Basinwide Salmon Recovery Strategy, a document that received extensive public review as the "All–H Paper" earlier this year. The Basinwide Recovery Strategy describes general strategies and specific actions to be taken in habitat, harvest, and hatcheries (H's), as well as hydro, in order to recover anadromous and resident stocks. This fall, the Northwest Power Planning Council (Council) will update its Fish and Wildlife Program, with a major emphasis on biological objectives and subbasin planning.

All of these processes, and others, must come together to lay the groundwork for a comprehensive regional plan. If the plan is to be successful, action must be taken in all of the H's, across the life stages of the listed stocks. Bonneville, in cooperation with the Corps of Engineers (Corps) and the Bureau of Reclamation (Reclamation), is committed to a strong set of hydropower actions to aid in recovery of listed species. We will continue to implement existing measures for the FCRPS and will build on these measures with even more aggressive hydropower improvements. We also intend to expand our efforts to capture certain "offsite" recovery benefits, in the form of habitat enhancements, hatchery reforms, and support for more selective harvest.

Today, I would like to cover three points about the upcoming decisions on Columbia River Basin salmon recovery. First, I will describe the practical measures we intend to implement for Federal dams. Second, I want to discuss the importance of performance standards as a tool to ensure that the hydropower system and the other H's achieve real results. Finally, partnerships among agencies, among governments, and with the citizens of the region are key to achieving our goals and recovering the fish. This means not only joint planning and mutually agreeable solutions, but also appropriate sharing of the responsibility for funding and implementation.

HYDROPOWER IMPROVEMENT MEASURES

There is some good news about the hydropower system and salmon recovery. Our recent efforts to improve fish survival through the Federal dams have met with real success. In the 1970's, the survival rate through mainstem dams was about 30 percent. But since the Council's Fish and Wildlife Program in the early 1980's and major investments in fish passage improvements by Federal agencies since 1993, juvenile salmon survival through the eight dams on the Columbia and Snake Rivers has steadily improved.

Today, according to NMFS data, the juvenile survival rate for Snake River stocks is about the same as it was in 1960's—before the four Lower Snake River dams were in place—about 40–60 percent (i.e., spring/summer chinook and steelhead hydrosystem survival in the 1960's was 32 to 56 percent, when four dams were not in place). Four additional dams were constructed between 1968 and 1975 with survival estimated during the 1970's typically ranging from 10 to 30 percent. During the most recent years (1995–1999), spring/summer chinook salmon survival ranged from 42 to 59 percent. Survival during this recent period is substantially greater than the 1970's and similar or higher than levels in the 1960's. The data is from the NMFS White paper on passage, April 2000. Comparisons for fall chinook survival cannot be made because of limited data for pre- and post-hydrosystem construction.

The Federal agencies' consultation on the draft Biological Opinions led to agreements on management actions that were eventually included in those draft documents. We used information on biological benefits, performance standards, and costs

to agree on spill levels for this year's fish migration. These were incorporated into proposed agreements for future migration seasons in the draft Biological Opinions.

The Federal hydro operators are proposing to take aggressive steps at the Federal dams to further improve the survival of juvenile and adult salmon and steelhead through the hydrosystem. These actions will build on our successes and put more emphasis on accountability and results.

The measures can be broken down into these categories:

• Water management/flows—management of system storage to provide a more natural river flow in the spring and summer during fish migration. We will implement flood control adjustments in order to further minimize risks to resident fish from salmon flows.

• Juvenile fish transportation—continued collection and transportation of fish downriver in barges to avoid mortality at projects and in reservoirs using a "spread the risk" approach and reduced reliance on trucking for fish transportation.

• Improved juvenile fish passage—improved spill management and other actions at the projects designed to improve juvenile fish survival as they pass the dams. The FCRPS was derated as a result of the 1995 NMFS Biological Opinion in order to spill water for fish. The spill agreements in the new draft Biological Opinions will not result in a significant additional derating.

• Adult passage and research—configuration and research activities to improve adult passage survival.

• Water quality—actions to improve total dissolved gas levels and water temperature within the mainstem to improve fish condition.

• Mainstem habitat—design and implementation of an experimental program to improve mainstem habitat.

• Predation measures—operations and/or active management of salmonid predators in the mainstem.

• Sturgeon and bull trout—flow and other measures to contribute to recovery of resident fish.

Running a parallel track to this aggressive strategy—and the other habitat, harvest, and hatchery improvements contemplated in the Basinwide Recovery Strategy—would be a commitment from the hydropower operators to annual and 5-year planning and to rigorous evaluation of progress being made toward fish recovery.

The measures we are currently taking will not, by themselves, be enough. Actions must be taken across all the "H's" in order for the region to meet recovery goals. Recent ocean conditions and adult salmon returns are also encouraging. The tally of adult spring chinook at Bonneville Dam is the highest since the dam was built in 1938.

Performance standards will play a pivotal role to assure we are achieving real results. They will be used to determine the success of our proposed hydropower actions and the success of actions in the other H's as well.

PERFORMANCE STANDARDS

Bonneville has been a continuing advocate for performance standards for salmon recovery. We believe that scientifically sound performance standards are the most reliable way to achieve improved survival in each salmon life stage. A recovery plan based on achievable performance standards will be more durable in the long term. The hydro operators worked closely with NMFS and USFWS as well as the Administration on performance standards for the FCRPS that were included in the draft Biological Opinions.

Performance standards are scientifically-based, describing the contribution needed at each life-history stage in order to achieve overall biological goals and objectives for recovering the fish. Habitat and hatcheries are important at the egg and smolt-life stage. Hydro and harvest come more into play in the juvenile and adult life stages. By looking at the contribution from each life-history stage, we are also able to assign scientifically-based standards to individual H's to achieve.

Performance standards provide increased flexibility to tradeoff among the "H's," which in turn makes the plan more implementable. For instance, Bonneville and the other operating agencies can fund habitat improvements that would not otherwise occur as "offsite mitigation"—to help meet overall performance standards. A performance standard that specifies improvements at each dam could equate to the overall survival rate projected for breaching the four Lower Snake River dams. This would result in survival rates for listed stocks in both the Snake and Columbia Rivers that are higher than we have achieved today.

Performance standards could also serve as the yardstick against which we judge whether more aggressive recovery efforts are needed in the future. On the other hand, Bonneville believes that, if reasonable performance standards are set and

achieved in each of the four "H's," prospects are good that the stocks could recover without breaching the four Lower Snake River dams.

That said, we must remember that the science still presents us with a significant range of uncertainty about which measures will best recover the stocks. Performance standards must be based on the best scientific judgment, in the face of these huge uncertainties. However, in setting standards based on judgments that are to a significant extent qualitative, we must be prepared to alter course if further research indicates our assumptions are flawed. The performance standards incorporated in the draft NMFS Biological Opinion attempt to reflect a range of assumptions about some key uncertainties. We look forward to continuing to work with NMFS and the region to further refine this work.

PARTNERSHIPS WITHIN THE REGION

There are many Federal, regional, and tribal government entities with a part in upcoming decisions about fish recovery: Federal agencies concerned with anadromous fish and those concerned with resident fish, Indian tribes, Federal hydro operators, non-Federal dam owners, the Council appointed by the four State Governors, and Federal land use agencies, to name a few. For a plan to work, it must bring together the efforts of all of the government agencies that are working on the Endangered Species Act (ESA) with the Council's Fish and Wildlife Program amendment process, as well as the tribal planning of the 13 Columbia River Basin Tribes. It must bring together plans to recover all of the 12 listed salmon and steelhead stocks as well as resident species in the Columbia River Basin.

At the Federal level, Bonneville and eight other Federal action agencies [the Corps and Reclamation, as well as the NMFS, USFWS, the U.S. Forest Service, the Bureau of Land Management, the Bureau of Indian Affairs, and the Environmental Protection Agency] have been working together to describe a common approach to salmon, steelhead, and resident fish recovery in the "Basinwide Recovery Strategy." This coordination of Federal actions and proposals is unprecedented in the Columbia River Basin.

Of course, we recognize that Federal efforts alone are not enough. The States and the 13 tribes have important stakes in fish recovery, too. While Bonneville may be a significant funding source for regional salmon recovery, the science shows that hydro is only one of the four H's that must be addressed in order to recover the fish. There will be a number of other Federal funding components and contributions from local and State governments that must be part of a regional plan for recovering species. This must be a true and lasting partnership among all those with a stake in the region's future.

An important part of our coordination with the region is Bonneville's close working relationship with the Council. Habitat, hatchery, and subbasin planning actions are the most promising areas for enhanced regional cooperation with the Council's Fish and Wildlife Program.

The Council has proposed to use a subbasin planning approach as a framework for its upcoming Fish and Wildlife Program amendment process. Bonneville is very supportive of that approach, and we are encouraging active links between the habitat approach in the Basinwide Recovery Strategy and the Council's Program. Federal agencies and the Council staff are currently exploring several ways to make that happen. These include:

(1) common templates for subbasin (tributary) assessments and plans;

(2) common criteria for immediate actions designed to jump start recovery while planning is underway;

(3) common approaches to enhance estuary and mainstream habitat;

(4) common use of the Ecosystem Diagnosis and Treatment (EDT) methodology that the Council has undertaken; and

(5) common use of independent science reviews.

Hatchery reforms are also a common interest. The Council's Artificial Production Review identified key hatchery actions and criteria for reforms that must be coordinated into any regional approach to recover the fish.

The goal of these efforts is to have the Council's program bring unified regional direction for our basin-wide habitat and hatchery efforts—as well as for our funding priorities. If we are successful in coordinating our approaches, any habitat and/or hatchery measures in the Biological Opinions which Bonneville funds will be consistent and complementary with those that Bonneville funds under the Council's Fish and Wildlife Program.

CONCLUSION

Mr. Chairman, Bonneville is committed to action in the hydropower system that is needed to recover the fish. Today, I have described some of the essential elements for successful fish recovery in the Columbia River Basin as we move ahead with Biological Opinions for the hydropower system and the Basinwide Recovery Strategy. I want to re-emphasize that the unprecedented coordination among Federal agencies and the strong partnerships we are building with other governments and Northwest citizens is fundamental to our success.

In closing, I would like to highlight the fact that the effort to recover endangered salmon and steelhead in the Pacific Northwest is different from virtually every other ESA effort in one important aspect. It is different because most of it is funded, not by taxpayers, but by Bonneville's customers and ratepayers. We take this responsibility seriously. As Bonneville has told this subcommittee in the past, Bonneville is committed to implement and fund our share of a regional fish and wildlife plan. We have positioned ourselves financially to perform on that commitment.

Mr. Chairman, thank you for your attention. I welcome any questions you may have about Bonneville's fish recovery measures.

STATEMENT OF DAVID COTTINGHAM, SPECIAL ASSISTANT TO THE DIRECTOR, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR

Good morning Mr. Chairman. I am David Cottingham, Special Assistant to the Director of the U.S. Fish and Wildlife Service. I appreciate this opportunity to present testimony on behalf of the Service regarding the status of the biological opinions on the operations of the Federal hydropower system of the Columbia River.

The Service is conducting a consultation on the operations of federally-owned hydropower facilities on the Columbia, Snake, Clearwater, and Kootenai Rivers in the Columbia River Basin of the Pacific Northwest. We are consulting with the following action agencies: the U.S. Army Corps of Engineers, the Bonneville Power Administration, and the Bureau of Reclamation. At issue are the effects of operating the Federal Columbia River Power System (FCRPS) on the endangered Kootenai River sturgeon, threatened bull trout, and, to a limited degree, the threatened bald eagle.

The Service received two Biological Assessments from the action agencies in June 1999 and in December 1999. Those documents described the operations proposed for the Federal hydropower facilities. Since that time we have been working closely with the action agencies and the National Marine Fisheries Service (NMFS) to complete this consultation. Several coordination meetings were held in the spring of 2000 between representatives of the action agencies, the Service and NMFS. We shared a preliminary draft biological opinion with these agencies in May 2000. Comments on the preliminary draft opinion were received in June 2000. The draft opinion was released to States and tribes for comment on July 27, 2000.

Throughout this process, an emphasis has been placed on discussion of key issues, including minimization of adverse effects to sturgeon and bull trout from the FCRPS operations in the Upper Columbia River. Our draft opinion requests adjustments to the operations and ramping rates at Hungry Horse, Libby, and Albeni Falls dams. We are also asking the Army Corps of Engineers to continue to study alternative pool elevations at Albeni Falls to increase Kootenai River sturgeon spawning for bull trout food source. The draft opinion also addresses actions at Libby Dam to allow increased flows to achieve flow objectives for sturgeon, while controlling additional total dissolved gas.

The Service has worked closely with NMFS throughout this process to ensure that the FCRPS operations to benefit sturgeon and bull trout do not conflict with those for salmon or steelhead.

The current schedule includes receiving comments on the "All H" paper (hydropower, hatcheries, habitat and harvest issues), and the draft opinions of the Service and the NMFS in late September 2000. These documents are now available for review by States, tribes, and other affected entities. We will then complete the opinion and accompanying documents as quickly as possible.

Mr. Chairman, this concludes my testimony. I will be happy to answer any questions you and members of the committee may have.

STATEMENT OF J. WILLIAM MCDONALD, REGIONAL DIRECTOR, PACIFIC NORTHWEST REGION BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR

Mr. Chairman and members of the subcommittee. I am Bill McDonald, Regional Director of Reclamation's Pacific Northwest (PN) region. I appreciate your invitation

to testify concerning the draft biological opinions issued in July 2000 by the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service on the operation of the Federal Columbia River Power System (FCRPS) and the Federal Caucus Draft Basinwide Salmon Recovery Strategy.

The Bureau of Reclamation (Reclamation) is responsible for the operation of 2 of the 14 Federal hydropower facilities of the FCRPS that are the subject of these consultations. Reclamation's FCRPS facilities are Hungry Horse Dam and Powerplant in Montana and Grand Coulee Dam and Powerplant in Washington. In addition to its two FCRPS projects, Reclamation operates and maintains 29 other projects in the Columbia River Basin, some of which include power plants and/or provide local flood control benefits but which are not operated or coordinated as part of the FCRPS. All 31 Reclamation projects are authorized to provide water for irrigated agriculture.

Reclamation is one of the three Federal action agencies that will be directly affected by the biological opinions. Reclamation also is participating with eight other Federal agencies in the development of the Basinwide Salmon Recovery Strategy, a conceptual multispecies recovery plan. The scientific underpinnings of the conceptual recovery plan provided the basis of NMFS' draft biological opinion on the operation of the FCRPS and Reclamation's projects. I will limit my remarks to actions Reclamation is called upon to take in the draft biological opinions.

The NMFS draft biological opinion calls upon Reclamation to take certain actions as part of a reasonable and prudent alternative (RPA) to avoid jeopardy to salmon and steelhead. These actions can generally be grouped in three categories:

(1) modification of FCRPS reservoir operations,

(2) water acquisitions for instream flow augmentation, and

(3) offsite mitigation for tributary habitat improvements. The FWS draft biological opinion also calls for certain FCRPS reservoir operation modifications.

Proposed actions in the RPA would require Reclamation to change its reservoir operations, primarily at Hungry Horse and Grand Coulee. Storage from Hungry Horse Reservoir and Lake Roosevelt (which is impounded by Grand Coulee Dam) would be utilized as primary sources of flow augmentation water to improve conditions for migrating salmon and steelhead in the lower reaches of the Columbia River. In particular, Lake Roosevelt, as the largest water storage reservoir in the Columbia River system, is called upon to provide a significant amount of the water for flow augmentation. Storage at Hungry Horse Reservoir would also be utilized to increase minimum flows below the dam to improve instream conditions for bull trout as called for by the FWS draft biological opinion.

The purpose of the proposed operational modifications in the NMFS RPA is to secure seasonal water to help meet flow targets for several listed species of migrating adult and juvenile salmon at downstream locations on the Columbia River. The operational modifications at Hungry Horse and Grand Coulee will change the timing of water storage, reservoir drawdown levels, and the scheduling of water releases as compared to historic reservoir operations. The scheduling changes will require that accommodations be made throughout the system to meet demands for power production and flood control; consequently, system-wide operational modifications are built into the RPA to accommodate these needs.

Although the operational modifications can be accommodated on a system-wide basis, there will be localized impacts. Among the impacts is a deeper drawdown of Lake Roosevelt surface elevations during July and August of low flow years. The RPA also calls for additional drafts at Banks Lake (an off-stream storage reservoir that delivers irrigation water to the Columbia Basin Project). Reclamation has not yet initiated the studies needed to assess the extent of the impacts or to determine appropriate mitigation actions.

The proposed RPA also directs Reclamation to continue flow augmentation in the lower Snake River by providing water from its storage facilities in the upper Snake River basin by annually providing 427,000 acre feet of water from its storage facilities in the upper Snake River basin from willing sellers consistent with State water law. NMFS' 1995 FCRPS Biological Opinion likewise called on Reclamation to provide 427,000 acre-feet of water annually from the upper Snake River. The water was to be obtained in accordance with State water law and from willing sellers. Reclamation has, in fact, provided that water every year since 1993 by working with the State of Idaho to release augmentation flow water from uncontracted storage space, through leases from the State water bank, and through purchased (or buyback) of contracted storage space.

In addition, the draft NMFS biological opinion proposes that Reclamation will undertake "offsite mitigation" actions by addressing instream habitat issues in 16 of the Columbia Basin's 53 subbasins, many of which do not have an authorized Reclamation project. The RPA action calls for screening diversions, removing or modi-

fying instream barriers to fish migration, and acquiring water for instream flows. While Reclamation has successfully provided fish migration benefits in the Umatilla and Yakima River basins where we have site-specific authority, we need additional authority to construct or fund construction of such facilities at non–Reclamation projects on a broader scale. We look forward to working with the Congress, the Northwest States, Columbia River Basin Indian Tribes, on this and other related programs.

Mr. Chairman, that concludes my testimony.

COLUMBIA RIVER POWER SYSTEM: BIOLOGICAL OPINION AND THE DRAFT BASINWIDE SALMON RECOVERY STRATEGY

THURSDAY, SEPTEMBER 14, 2000

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON FISHERIES, WILDLIFE, AND WATER,
Washington, DC.

The subcommittee met, pursuant to recess, at 1:05 p.m. in room 406, Dirksen Senate Office Building, Hon. Michael D. Crapo (chairman of the subcommittee) presiding.

Present: Senator Crapo.

OPENING STATEMENT OF HON. MICHAEL D. CRAPO, U.S. SENATOR FROM THE STATE OF IDAHO

Senator CRAPO. This hearing will come to order.

I thank you ladies and gentleman for appearing today for the second day of this subcommittee's hearing to examine the draft biological opinion and the draft recovery strategy for anadromous fish.

If I could summarize the testimony that we heard yesterday, to me it is that these Federal documents are deficient, both in terms of the process used to develop them, and the products, themselves. The representatives from the Federal Caucus even admitted that there were certain deficiencies that they hoped to correct before the biological opinion becomes final within the next few months.

As I see it, this draft biological opinion appears to be an incremental creeping policy initiative that will not solve the problem with the fish, but, instead, will steadily erode State and tribal sovereignty. This document must be improved before it becomes final, and I urge the Federal Caucus to use the next few months wisely to work more collaboratively with the region and to get this right.

Today's witnesses will offer us a detailed examination of how these draft documents came about and how they can be improved. As I have said, we will have more hearings in the future, including field hearings in the Pacific Northwest, where we will hear from many more interests and individuals, and I intend to include the technical Federal representatives at that time for a further, more in-depth discussion of these proposals.

It is very clear that not everyone who wanted to testify was able to be here during these 2 days of hearings. We will make sure that everyone has an opportunity to be fully heard on these issues as we proceed.

As I did yesterday, I will again remind the witnesses that we have a 5-minute rule for the oral testimony presentation, and we encourage you to, as strictly as you can, follow that. The green light will be on for 4 minutes. The yellow light will be on when 1 minute remains. And then the red light means that the time has expired and we encourage you to wrap up your thought at that point.

As I usually say at these hearings, it is very likely that you won't be finished saying what it is that you wanted to say when the red light goes on, and I encourage you to recognize that we have your written testimony and it will be carefully reviewed and there will be an opportunity for questions and answers where you will be able to add more elaboration to comments that you may not have been able to make in your oral presentation. We encourage you to pay attention to the lights.

I also often usually say, if you are like me and sometimes forget to watch the lights and you start going over too long, I'll rap the gavel a little bit just to remind you that it is time to wrap up.

We would like to begin with the first panel. The first panel consists of: Mr. Nick Bouwes of the Oregon Department of Fish and Wildlife; Mr. Ed Bowles of the Idaho Department of Fish and Game; Mr. Keith Kutchins, the Shoshone-Bannock Tribes; and Mr. Earl Weber of the Columbia River's Inter-Tribal Fish Commission.

Gentlemen, we welcome you with us today. We will go in the order that I announced your names. I guess we'll start over here with Mr. Bouwes. Please feel free to proceed.

STATEMENT OF NICK BOUWES, BIOMETRICIAN, OREGON DEPARTMENT OF FISH AND WILDLIFE, PORTLAND, OR

Mr. BOUWES. Thank you, Mr. Chairman. My name is Nick Bouwes, and I am representing the Oregon Department of Fish and Wildlife. I'm a fish population analyst that has worked on the regional collaborative process known as PATH, intended to provide the scientific support for the operation of the Federal Columbia River power system, to be described in NMFS' 1999 biological opinion.

As you know, the biological opinion was delayed until this year. During this 1-year delay, NMFS has established within their agency a new analytical approach, the cumulative risk initiative, or CRI.

My comments today are directed toward the analytical components of the draft biological opinion, which now relies solely on this new CRI process for listed Snake River stocks.

The Oregon Department of Fish and Wildlife is concerned that the biological opinion underestimates the true risk to these stocks. First off, we believe NMFS has set the standard too low of what constitutes a risk of extinction. NMFS defines extinction of a population as "one fish returning over a 5-year period." In reality, populations are effectively extinct at much greater spawner numbers. As a population becomes small, whole hosts of problems occur, such as spawners are unable to find a mate or the occurrence of inbreeding, and the population enters what is termed an "extinction vortex."

NMFS is fully aware of this threshold and has developed a framework that describes the minimum viable salmonid population, which they term VSP. If any other alternative thresholds evaluated by NMFS were used, risk to these stocks would be much greater.

Also, the draft biological opinion assumes mortality due to the dams and reservoirs on migrating juvenile salmon only occur in the hydrosystem. It is reasonable to expect that young salmon die after the stressful experience of passing through eight dams and migrating through eight slow-water reservoirs. This stress will decrease their ability to forage efficiently, avoid predators, and fight diseases, and to cope with the transition from fresh water to salt water.

This mortality that happens outside the hydrosystem, but occurs only because of a fish's experience in the hydrosystem is termed "delayed mortality." Direct evidence indicates it exists, and indirect evidence suggests that it is substantial. The draft biological opinion assumes it does not exist.

These are just some of the assumptions NMFS has chosen to describe an optimistic view of the risk to these stocks. What is the result of not adequately capturing the risk to these stocks? Well, this means the bar has been set too low, and, therefore, mitigation responsibilities to clear that bar or to ensure the survival of these stocks is much less than is truly needed.

The result is NMFS' analysis suggests that only a 20- to 30-percent survival improvement for Snake River spring/summer chinook is needed to ensure the survival of these stocks in 24 years, in contrast to the greater than 280 percent increase estimated by PATH, an order of magnitude difference.

Also, we believe expected survival improvements from NMFS' proposed management action, or the RPA, is too optimistic. The expected improvement in juvenile survival is optimistic because it is based on recent well-above-average run-off years. The biological opinion assumes this improvement equates to recent improvements in the hydrosystem that will be realized forever.

The RPA is assumed to reduce adult losses in the river by 25 percent. This large benefit is not supported by any information or analysis.

Any other survival improvements needed to avoid jeopardy is assumed to occur from offsite mitigation that is also not supported by data or any analysis of feasible improvements. It is simply assumed possible.

As I think other panel members will testify, it is unlikely that these actions will have an immediate impact in the Snake River stock.

The perilous state of ESA stocks is real. Last year, in two of the Snake River spring/summer chinook indicators stocks that spawn in wilderness areas, zero fish returned. We may have already lost Snake River sockeye, and coho have gone extinct in the Snake River Basin since efforts have been made to mitigate for Snake River dams.

In our opinion, the draft biological opinion does not use the best available scientific information to determine the management actions most likely to recover listed stocks. The determination of no jeopardy was based only on the most optimistic assumptions about

the risk to these stock and survival improvements expected under the RPA.

Assumptions were not chosen by the weight of evidence, nor in the absence of evidence were they conservative, i.e., they don't avoid placing undue risk on listed stocks.

Finally, we do not believe the biological opinion adequately anticipates and has prepared an alternative action that can be immediately implemented if, at the end of the interim period, the current RPA has failed.

Thank you.

Senator CRAPO. Thank you very much, Mr. Bouwes.

Mr. Bowles.

STATEMENT OF ED BOWLES, ANADROMOUS FISH MANAGER, IDAHO DEPARTMENT OF FISH AND GAME, BOISE, ID

Mr. BOWLES. Thank you, Mr. Chairman. My name is Ed Bowles. I am the anadromous fish manager for Idaho Department of Fish and Game. I appreciate the opportunity to testify on the draft hydrosystem BIOP and recovery strategy. These Federal documents will dictate recovery efforts, and thus profoundly affect the very existence and future of wild salmon and steelhead in the Snake River Basin.

In my professional judgment, the current Federal approach is destined for failure on several fronts.

First, its characterization of extinction risks and conservation opportunities is not scientifically defensible.

Second, too much of the hydrosystem's conservation burden is shifted to other sectors which are unable to shoulder this burden.

Third, specific actions and their feasibility of adding up to recovery are not identified.

Fourth, a check point system is established that basically leaves the breach decision up to the whims of nature.

This is a recipe for failure, with significant ecological, social, and economic consequences.

In the midst of all the debate on Snake River fish, it is easy to lose sight of what is not disputed. There is general agreement that runs in the 1960's were sustainable and relatively stable; that fish declined rapidly following completion of the main stem dams; that dams played a significant role in this decline; that stocks are still imperiled; that smolt transportation and flow augmentation have been the centerpiece of efforts to compensate for the dams; and that the overall downward trend has not reversed, although there have been welcome pauses during favorable environmental conditions.

So the dams were a significant factor in the decline of the fish, and management actions have failed to reverse this decline. Based on these facts, the obvious conclusion is that smolt transportation, flow augmentation, and other measures failed to fix the problem.

To conclude otherwise, there has to be compelling evidence that the benefits are real, but other recent factors mask these benefits. This is the key science question.

As detailed in my written testimony, the weight of scientific evidence does not indicate the dams have been fixed but the benefits masked.

NMFS has failed to scientifically counter this block of evidence, failed to demonstrate the evidence supporting their view, nor allowed additional collaborative analysis.

All the salmon managers in the basin except NMFS believe the hydrosystem is still the primary problem and should be the focus of recovery efforts.

In spite of this information, the draft BIOP and recovery strategy represents a fundamental shift to a diminished role of the main stem hydrosystem and a heightened role of habitat, hatcheries, and flow augmentation. Conservation opportunities and the other H's cannot make up for the impacts of the main stem hydrosystem. The numbers simply do not add up.

This is not to say that tributary and estuary habitat improvement, predator control, selective fisheries and conservation hatcheries are not important. In fact, their importance increases the closer our fish get to extinction, but the conservation burden of those sectors must be kept in perspective.

To be scientifically defensible, the BIOP needs to be corrected. The BIOP uses a series of optimistic assumptions, resulting in less risk of extinction. This results in relatively little survival improvement required to avoid jeopardy.

In spite of these optimistic assumptions, the hydrosystem measures in the BIOP just barely avoid jeopardy for some stocks and fail to avoid jeopardy for others; thus, the shift to other H's to make up the difference. In other words, all the key optimistic assumptions have to be true just to get to no jeopardy. Even if one is wrong, the house of cards falls. Nearly all of theses assumptions are questioned by State, tribal, and Fish and Wildlife Service fisheries scientists.

The weaknesses of the Federal documents can be easily corrected, but only through scientific collaboration, which is currently lacking. Collaboration will focus the BIOP back on the hydrosystem and allow managers to pursue the best possible measures within established policy constraints.

If the breach decision is deferred, the Governors' recommendations do a better job of keeping the primary sources of discretionary mortality in focus, and embracing a conceptual approach to attempt to address these problems prior to breaching dams.

As described by Governor Kempthorne yesterday, these actions should include immediate reduction of predators in the estuaries, more spill at main stem dams, better bypass systems, improved turbine design, more flexible flood control operations, and more-selective fishing techniques.

We have the bookends fairly well defined for what is possible under current dam configurations and operations. When environmental conditions favor the fish, the fish can hold their own and even rebuild slightly. When nature throws a curve, the fish slip rapidly toward extinction. On average, the trend is downward.

We are currently seeing the benefits of high natural runoff coupled with good ocean conditions. This has provided a welcome respite the fish desperately needed. As long as these conditions persist, I believe there may be time to pursue truly aggressive non-breach alternatives built on the foundation of the Governors' recommendations. If environmental conditions deteriorate, decision-

makers should be ready for emergency actions, including reconsideration of the natural river option.

The draft hydrosystem BIOP and recovery strategy are not currently constructive in this effort, but they can be. If the scientific errors and omissions are corrected through collaboration, the conservation burden refocused on the hydrosystem, and truly aggressive actions put in place within all the appropriate sectors, then I believe the BIOP and recovery strategy can be better set up for success.

Thank you.

Senator CRAPO. Thank you, Mr. Bowles.

Mr. Kutchins.

STATEMENT OF KEITH KUTCHINS, ANADROMOUS FISH BIOLOGIST, SHOSHONE-BANNOCK TRIBES, FISHERIES DEPARTMENT, FT. HALL, ID

Mr. KUTCHINS. Good afternoon, Mr. Chairman. My name is Keith Kutchins, anadromous fisheries biologist for the Shoshone-Bannock Tribes.

I have reviewed the draft documents and am deeply concerned that they fail to rely on the simple scientific facts that are evident to a vast array of scientists. The simple science of observing salmon Redds and juvenile fish densities show that the listed Snake River spring/summer chinook and steelhead populations continue on a downward path.

The Shoshone-Bannock Tribes are very concerned that the NMFS concludes there have been improvements to the hydrosystem in the past 5 years. Why aren't we seeing any results of those improvements in the Salmon River?

I spend many weeks of each year working in the river. We repeatedly invite NMFS staff and decisionmakers to visit the headwaters, but they have yet to join us. They are not intimate with the waters they are making decisions on.

The egg-to-smolt survival rates in these headwaters have not decreased in the past 25 years; however, the smolt-to-adult survival rates have plunged dramatically. Computer models are misused when they deny these simple observations.

The NMFS is wrong when they conclude that the greatest opportunities for survival improvements of listed Snake River salmon may hinge on efforts to restore the health of the Snake River tributaries. I am not denying there are problems in these tributaries. For example, we've repeatedly reported dewaterings in the Lemhi River and other smaller tributaries as violations of the ESA. However, fixing these problems might only be enough to stop the declines of listed fish and will not recover the runs.

Ocean conditions have recently improved, but only ocean harvest rates are within the immediate control of man.

Harvest rates that exceed 10 percent on under-escaped runs of Snake River fall chinook and steelhead are inconsistent with conservation principles applied to other stocks.

The NMFS is wrong to conclude that the only roles for hatcheries are to prevent negative effects on wild fish and to conserve wild fish. Yes, these are good roles for hatcheries, but another very important role of hatcheries is to recover listed fish populations.

The NMFS is wrong to use genetics as the over-riding factor to impeded tribal supplementation actions. The NMFS needs to incorporate the use of hatcheries to recover listed populations rather than only using hatcheries as a conservation tool to prevent extinction.

This year, many Salmon River spring and summer chinook returned to the Rapid River and South Fork Salmon River Hatcheries, and sports harvests occurred alongside treaty fisheries directly below those hatcheries. Thousands of surplus hatchery salmon were trapped at the hatcheries and trucked back down multiple times so that the fish could swim through the fisheries over and over again in order to increase their chances of being caught. The "biologists" used the fishermen to club these fish, wasting hundreds of thousands of viable and valuable eggs. The Shoshone-Bannock Tribes objected to this recycling and proposed that these surplus fish instead be transplanted into other Salmon River areas to spawn.

However, the NMFS determined that these surplus Salmon River fish were genetically unfit to be used in other Salmon River areas. The NMFS theories on salmon genetics prevent using abundant, available, and appropriate donor brood stocks from being used to recover listed fish.

I have already provided some detail in my written testimony that explains our concerns about the new and seemingly ever-changing science that the NMFS is now using for the hydrosystem.

The settlement of the *Idaho* v. *NMFS* lawsuit established a robust scientific process called PATH in order to continue the efforts to resolve uncertainties that remained in 1995. Yesterday, we heard that PATH was recently replaced because the uncertainties in the PATH assumptions are not going to be resolved.

The CRI is even less robust and more uncertain than the PATH, plus, the CRI is not a product of a legal settlement. The newly proposed BIOP does not define what we are measuring in order to determine in 5, 8, or 10 years if there has been a change in the jeopardy or how we will determine if the reasonable and prudent alternative is succeeding in recovering the listed fish.

The new BIOP and recovery strategies call for breaching the four lower Snake River dams and should also recommend an immediate moratorium on any non-breaching capital investments of those four dams, because those expenditures will end up being wasted.

The Shoshone-Bannock Tribes stated this many years and several hundreds of millions dollars ago. Those dollars have failed to reverse the decline of the listed Snake River fish.

We hear that barging smolts results in 97 percent survival through the hydrosystem. This estimate does not include the potentially high delayed mortality rates. There has yet to be a transportation to in-river survival benefit ratio test that compares transportation to in-river survival. The tests have only compared transportation to in-reservoir and through-dams survival, which greatly underestimates a truly in-river survival rate.

The Shoshone-Bannock Tribes believe in ecosystem-based approaches to salmon recovery in the Columbia River Basin. What is done for one native species should not hurt another native species.

In summary, the PATH concluded that the benefits from breaching the four lower Snake River dams are more certain than nonbreaching alternatives. The NMFS has boldly rejected that science and concludes there is significant uncertainty with breaching the four lower Snake River dams.

I do not believe that this change is adaptive management, but instead reflects a serious flaw in the scientific process. My suspensions are piqued because of repeated NMFS opinions and actions that do what is politically feasible rather than doing what the fish need. To the best of my knowledge, the NMFS does not have any mandate to do what is politically feasible. With all due respect, it is my understanding that doing what is politically feasible is a congressional duty.

Thank you, Chairman Crapo and the subcommittee, for letting us testify.

Senator CRAPO. Thank you, Mr. Kutchins.

Mr. Weber.

STATEMENT OF EARL WEBER, FISHERIES SCIENTIST, COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION, PORTLAND, OR

Mr. WEBER. Thank you, Mr. Chairman.

My name is Earl Weber. I am a fisheries scientist with the Columbia River Inter-Tribal Fish Commission. I was the lead scientists for the tribes on PATH until it was recently mothballed.

I want to start by sharing my concerns, particularly from the analytical point of view, with the NMFS process, but I don't want to dwell on model outputs because it has been our experience that the CRI model would behave similar to the PATH model given similar input assumptions.

I want to discuss today, particularly, what I consider the two fundamental assumptions that are the mainstays of the current BIOP. One is that transportation is mitigating for or is capable of mitigating for the hydropower losses, and the second one is that substantial increases in the other H's are possible.

Let me begin with transportation. There is no dispute that transported fish are surviving at levels well below that needed to sustain survival. I have blown up here a graphic from my testimony that shows that survival of transported wild spring/summer chinook salmon from Lower Granite Dam back to Lower Granite Dam—it's called smolt-to-adult returns. The graphic shows different kinds of tagging types, and also shows a 2- to 6-percent goal established by PATH. Notice that the survival rarely, if ever, meets the lowest part of the goal. The solid circles going along the right side of the axis, kind of bouncing along the X axis, are from PIT tag data.

For those 9 years, the latest 9 years for which we have PIT tag data, the fish survived, on average, at less than a half a percent. In other words, they would need a fourfold increase to meet the lower survival goal. That is approximately an eightfold increase needed to reach the recovery goal.

Now, we in PATH allowed for the fact that there could be some alternative explanation masking what would otherwise be a successful transportation program. That's not a problem. The problem is that, to date, in the past 5 years, no one has been able to de-

scribe a biological mechanism that would explain why Snake River fish collapsed while down-river stocks continued to maintain healthy runs.

NMFS will point to genetic differences or ocean cycles. First of all, the genetic differences are slight, and I think they depend on whether you are a "splitter" or a "lumper" or whether you could say there's genetic differences at all. But, more importantly, genetic differences do not kill the fish. What kills fish is starvation, predation, or disease.

I think it is important to note that both the Snake River stocks and the downriver controls occupy the same ocean areas, roughly from northern California to the Gulf of Alaska. There they feed on basically upwelling gyres that bring nutrient-rich water to the surface and provide a food base. These fish, both stocks, up-river and downriver stocks, or substocks, have been doing this since they speciated approximately 12 million years ago.

I believe it is unrealistic to assume that suddenly in the 1960's and 1970's, as the dams were built, that the Snake River stock suddenly became unable to find food, whereas the downriver stocks continued to be able to.

It is equally unlikely that after 12 million years the Snake River stocks encountered some kind of previously unencountered predator and the lower river stocks did not.

A third, disease, is likely. In fact, NMFS published a report in 1989 linking the decrease in survival with injury and stress due to collection transportation and BKD—bacterial kidney disease—which is ever present.

If NMFS now thinks that there is a more robust hypothesis, they should share it.

I don't mean to say that there are no such things as ocean cycles, but if there were ocean cycles that are causing these declines, it should be simple for scientists to look back in the record and see if we've experienced these declines in the past. We hav looked at that, and they haven't.

With regard to the other H's, let me briefly say that there is certainly room for improvement in habitat in the Snake River Basin, but there is also pristine habitat in Marsh Creek and Sulfur Creek, both of which have had zero returns in recent years.

There are no hatcheries in four of the seven Snake River indicator stocks, including Marsh Creek and Sulfur Creek. Obviously, poor hatchery management is not the cause of the declines.

Harvest rates are very low. I think everyone is in agreement that harvest will not recover these stocks.

Just by way of a brief conclusion, I think that it is safe to say that we in PATH would not have come to the conclusions we came to without some pretty hard evidence, and I think that there is also very good reasons why the ISG called their report, "Return to the River."

Finally, there is good reasons why the Idaho chapter of the American Fisheries Society, the Oregon chapter of the American Fisheries Society, as well as the western division of the American Fisheries Society, have all passed resolutions calling for breaching.

With that, I will thank you and look forward to any questions you have.

Senator CRAPO. Thank you very much, Mr. Weber.

Mr. Bowles, since you are from Idaho, I guess you get either the benefit or the burden of the first rounds of questions. I'm going to start with you.

Could you tell me whether there has been collaboration between your agency and the Federal Caucus agencies in the development of this biological opinion?

Mr. BOWLES. Mr. Chairman, they initially started out with what I consider a good model for collaboration after the *IDFG* v. *NMFS* decisions in the early 1990's, but since PATH was discontinued and we have a new analysis coming out that provides the main basis for the scientific foundation of these documents—it's called CRI—there has been very little scientific collaboration, and those efforts that we have taken to try to influence that analysis and provide our input have been not well received and not really a forum to do that.

So the State of Idaho has tried on several occasions, both formally and informally, to have scientific meetings and others, and we really appreciate that effort, but they haven't provided much fruitage, because what we have right now is a situation where you have information put out on the web or reports put out or other things like that that we are there to comment on, but we aren't an integral part, us or the other State and tribal salmon managers, aren't a part of actually developing the methodologies and analyzing the results. We are basically there to critique, and that's not a healthy forum for collaborative analysis. It doesn't provide ownership and it doesn't make use of all of our collective expertise. Quite frankly, it runs risk then of institutional bias because we don't have the safety protections of a number of us all working together.

Senator CRAPO. Yesterday the Federal agencies—or NMFS, I believe it was—testified that since the fall of 1999 that they had a true collaborative process and effort underway. I would like to ask you sort of a bifurcated question, and I am going to ask each of the other members of the panel this same type of question, so please be thinking about this.

It seems to me, if I recall correctly, that the fall of 1999 is basically when they surfaced again at having scrapped the PATH model and developed the CRI model, and basically in secret, as I see it. I know that wasn't entirely in secret, but with very little collaboration.

So the question I have for you is: am I right on my timeframes? From about somewhere in 1998 through about the fall of 1999, what was the situation like in terms of collaboration?

Mr. BOWLES. Prior to, as you characterize it, Mr. Chairman, as the resurfacing, there was no collaboration or any contact, so to speak, that I am aware of, but after that time then the collaboration was, I guess, NMFS' definition of collaboration, which is put the results on a web page and hold workshops of your results and let people see that and critique it, but not provide any opportunity to work together on both methodologies and analyses, which provide the foundation of the results.

So you end up from the outside looking in trying to influence a process that has already, quite frankly, been largely completed. In my mind, that is not collaboration.

Senator CRAPO. Thank you.

I just want to start with you, Mr. Bouwes, and then I'll just get to each of the other witnesses. I would like you to respond to the same issue. Do you feel that there has been collaboration between your agency or your interests and the Federal Caucus on the development of this draft biological opinion? What is your opinion of whatever collaborative efforts you are experiencing?

Mr. BOUWES. I guess the way I would define collaboration is that we're all full and equal partners in evaluating the factors responsible for the decline of these stocks, and then evaluating the alternative management actions that would recover these stocks.

That was what PATH was intended to be, so in that sense PATH was used in—we were a collaborator in PATH with National Marine Fisheries Service. However, with the cumulative risk initiative, using my definition of collaboration, I do not believe that we were considered partners, full and equal partners in that process.

The initial process was developed and then they had a workshop in the fall of 1999, but it took about 8 months to get to that period.

We were allowed to come to this workshop, but I remember I asked a question at this workshop and the response was, "Well, we're not here to answer questions." To me, that's really not a definition of collaboration.

We have tried to point out the deficiencies in their model. We have taken a very hard look at their model. To my knowledge, they've only incorporated a couple of minor fixes to their model, but the main problems that we have to the model have not been incorporated, so I would not consider that a collaborative—that we were in collaboration with National Marine Fisheries Service on the cumulative risk initiative. That's the only process for Snake River stocks that has been used in the biological opinion.

Senator CRAPO. Thank you.

Mr. Kutchins.

Mr. KUTCHINS. Yes. Thank you, Mr. Chairman.

It appears that perhaps collaboration is synonymous with consultation. From the tribal perspective, tribes have been asking for consultation. Consultation means it's not just notification, but it is a genuine effort where you work together at the technical level to come to agreement on whatever you are doing, and that way your policy decisionmakers have good, solid information upon which to make their decisions. They will know where there is agreement and where there is disagreement.

I completely agree with what other panelists have said. NMFS' definition of collaboration appears to be notification. As a matter of fact, somewhere around July 1999 when the PATH made their last report and it was more or less rejected by NMFS, and then in the Fall of 1999, the Columbia Basin Fish and Wildlife Authority worked together—that's all 13 tribes, four States, and two Feds—to do what we called the CAT. It was a Collaborative Analytical Team. I was on that work group.

We kind of saw where something was happening to PATH, it's being rejected. I was under a lot of angst because I kind of thought PATH was almost like a court order from the *Idaho* v. *NMFS* lawsuit.

In this CAT we tried to come up with a process, anyway, so that we could all collaboratively work together toward a new analytical tool. There's more listings. There's 12 species instead of 4. It's a bigger picture than just the Snake River, so maybe the PATH wasn't enough. But, even the CAT then went and just disappeared.

Basically, to be blunt, it seemed like it was wrestled away from us by the NMFS and their science group, and along comes CRI, and we are all trying to scramble to catch up and get on their website and find out what it was, so there was no collaboration in terms of us all working together to develop this tool.

Senator CRAPO. Thank you.

Mr. Weber.

Mr. WEBER. Thank you. I guess my view on this would be that PATH was continuing to operate until early this year. In July 1999, NMFS had a workshop where they introduced their CRI initiative, which had been underway by different members of NMFS—different from the ones that were involved in the PATH process.

Senator CRAPO. OK.

Mr. WEBER. There were perhaps a half dozen NMFS scientists from time to time involved in the PATH process.

What the Science Center did was hire individuals from outside of the basin to do a fairly simple model. They wanted a simple model and, frankly, they got a simple model. The problem is that it is somewhat inadequate. I think that would show up had some peer review been built into the process.

Unfortunately, when they—I won't say they unplugged PATH. It wasn't quite that sudden. But when they put the brakes on PATH and eventually defunded it, they didn't just take funding away from State and tribal scientists, they also took funding away from the facilitator that we had had for 5 years, they took funding away from three technical advisors that had been instrumental in the process and, in fact, had developed the PATH model. They took funding away from the Scientific Review Panel that was very familiar with all the documents that had been written by PATH over the years—a fairly substantial amount. It doesn't look like much when it is on a CD, but there was a stack of papers perhaps a foot high.

These folks were all very familiar with that process, and they disappeared along with us, with the State and tribal scientists. What we were left with is, as my colleagues have mentioned, kind of a situation where we were on the outside with our noses pressed to the window, and on paper, at least, given an opportunity to comment, but, in fact, most of our comments, and, in fact, even when we have reconstructed their model to show how we think it should be, how it would best incorporate best available data, our comments have been largely ignored.

So I think that is the situation we have now.

Senator CRAPO. Thank you.

From your testimony and the testimony that we heard yesterday from others, as well as from input that has been provided to me consistently over the last couple of years, it continues to me to seem to be very evident that there was no real collaboration going on and that, frankly, most of the other fisheries scientists who had been a part of the process up until approximately 1998 were out of the process.

What I have been hearing is not only did the opportunity for this hands-on collaboration not take place, but, as you just said, Mr. Weber, and others, and others yesterday even more strongly, even when input was provided in some context, over the website or in other contexts, it doesn't appear to have been considered or to have had any effect, and no one knows for sure whether it was considered and rejected or not considered or what, because it is just difficult to know how we got to this point because it has been such a closed process.

That being the case, now that the proposed biological opinion or the draft biological opinion is out, I now hear repeatedly, as has been testified to by every member on this panel, that this draft biological opinion is seriously flawed, both in terms of process and the product delivered.

Ed, I'm going to direct a question to you related to this. If there is any good news, it is that the draft biological opinion isn't yet final, and yesterday National Marine Fisheries Service very directly said that they were willing to use the next 3½ months or whatever time they had to seriously and meaningfully engage in collaboration and try to fix what these flaws that have been perceived are.

They also said, however, that they were going to stick with their science unless their science was rejected or somehow shown to be not adequate. So I'm not sure exactly what it was that they're saying the ultimate outcome is going to be here in terms of willingness to address differences in the approaches considered.

But, Ed, the question I have for you—and I may ask the others to briefly respond to this, as well—is, we've got 3½ months, essentially, given the timeframe that NMFS has talked about. Assuming that NMFS follows through on its commitment yesterday to meaningfully and aggressively engage in collaboration to try to address perceived flaws in the biological opinion, what would you recommend that could be done in the next few months that would make the biological opinion more scientifically defensible and, therefore, more legally defensible?

Mr. BOWLES. Mr. Chairman, that's a very good question, and that's right kind of at the nugget of the issue, because I think all of us here share a desire to have a good biological opinion, one that is sound biologically and that is progressive from a management standpoint.

The first piece of that is to get it right. I don't think any of us—and I am not saying that that automatically means NMFS has to embrace my science. That's not what collaboration is. We first have to get back to the table to work out the differences that have come up through joint analysis, as well as peer review, to help us on some of the things that we can't agree on, independent sort of look.

This doesn't take long, because you can take a look at the evidence that is already available, look at that evidence and look at the weight of that evidence in the context of the decisions being made, and that sort of analysis does not require a long time. It just requires us getting our heads together.

In my mind, in order for the BIOP to be scientifically defensible—and I put this in my written testimony—there are some steps to be taken, scientific steps that have to be taken.

You first have to have good, solid grounding on what is extinction risk and what are the jeopardy standards. Then you have to go in—and I've outlined this in my written comments—you have to determine the amount of improvements that are necessary, survival improvements, in order to avoid extinction and meet the jeopardy standard. Then you have to determine what the fish mortality is among those life stages and what—this is a key piece of this—then you have to determine, of that mortality, what portion of that is discretionary. In other words, what is above and beyond the natural baseline that you can't do anything about. What is manageable?

Then, once you do that, you can go back in and assess what actions can address this and set up a program to evaluate it and give you feedback so you can adapt.

On almost all of those steps, I feel NMFS got part of it wrong. I think we can collectively help them get it right. I think the basis to get it right is already in the models and the analysis. You know, the CRI and other things I think, if corrected, can get it right.

So I don't have any problems with working with them as aggressively as we can for 3½ months, get the science right, and then proceed with the management actions.

Senator CRAPO. Thank you. Does anybody else on the panel want to supplement that?

Mr. KUTCHINS. With all due respect, Mr. Chairman, yes, I'm concerned that we don't have 3½ months. The comment period on this draft is in 2 weeks.

I understand that under ESA there is no requirement of NMFS to even offer the thing up for comment. I'm glad they did that. But we might need some help if what NMFS was saying yesterday—if they want that feedback in 2 weeks, yes, we can give it to them, but we can't do collaboration. We can't all get together and just sit down and meet. That will take a couple weeks or a month to do.

So if we can get that 3½ months, I bet we can do it.

Senator CRAPO. Mr. Kutchins, I appreciate that, and before I go to Mr. Weber and Mr. Bouwes I would indicate that you may be aware that, from virtually the outset of when it appeared to me that the Federal Caucus decided to go behind closed doors and come up with its recovery plan, I have objected, and I have objected primarily on the basis that they had ended the collaborative process and that they were going to come out with exactly what we now face, and so I agree with you. Timeframes here—I think 3½ months is pretty short in terms of getting this done. If NMFS limits it to a 2-week comment period and then just proceeds behind closed doors again, I think that would be a very, very fatal flaw in terms of the process of how we are going to get this resolved.

I can assure you that I—and I think many others here in Congress—will seek to be sure that NMFS' commitment to us yesterday is to work fully and aggressively and sincerely in a collaborative process to the point where the finalization is achieved.

Mr. Weber, did you have anything to add?

Mr. WEBER. Yes, Mr. Chairman.

I agree that the time remaining, if they want to stick to their schedule, is really almost too brief.

I would say that there are really two fundamental concerns right now with NMFS being able to complete their task.

First of all, I don't think they have the proper tool. Without getting too technical, they have an exponential model without any kind of what is called "density dependence." In other words, the population goes up like a sky rocket. We've referred to it as the "fruit fly model." There are people within NMFS that refer to it as the "neo-Malthusian model." It isn't very realistic, and it doesn't leave them very much time to develop a new model.

Just as an aside, within Inter-Tribe we are seeking funding to do a feasibility analysis with the existing PATH model, and I know that the people that can run the model and that developed the model are available. I would like to see them called back in to play, honestly.

The second problem, however, is even bigger, and that is that they have not defined what the actions are. Asking us to model something is one thing, but they haven't said what the actions that we are to model should be, and that, I think, is possibly even a bigger concern.

They've said that we are going to do certain things in the hydrosystem, and I think, again, as Dr. Bouwes and others have stated, those are all optimistic assumptions.

Senator CRAPO. Thank you.

Mr. Bouwes.

Mr. BOUWES. Yes. I'd like to address something I think that was brought up by Mr. Stelle yesterday. If we are promoting collaboration, that that means we have to keep in mind that that doesn't necessarily mean that there is consensus and that, you know, Stelle was giving us a warning about that. I think what he meant by this is that NMFS has the ultimate responsibility to determine what the most prudent alternative is, so they are supporting what they believe are the most reasonable assumptions.

I think NMFS felt they did not have the authority over PATH, and thus consensus was achieved in PATH that was contradictory to NMFS' conclusions.

I think there is a big misconception about PATH that it was a consensus process. I don't believe it was a consensus process. I believe, I think, since the States and tribes support the collaborative process of PATH, that NMFS is concluding that the States and tribes were asking for consensus with NMFS to make a decision, and that's not going to be possible.

While PATH was not about consensus, it was an approach that incorporated alternative assumptions, and it gave you a range of answers with those alternative assumptions.

The approach NMFS is taking—which, if this is their definition of having NMFS approval is that it is not an approach of favored hypotheses, where NMFS has determined which are the most appropriate hypotheses.

What that has led to is they've looked at a range of hypotheses, and then they went across the board and said, "We're going to favor the most optimistic assumption of these hypotheses."

We don't believe that's a very risk-averse approach to managing these stocks.

The conservation burden should not be placed on the fish. We should be erring on the side of the resource that we're trying to manage.

In our detailed comments on the biological opinion, Oregon Department of Fish and Wildlife's detailed comments, we talk about these assumptions and what alternative assumptions could be used in their analysis that would basically address the optimism of the assumption, and so we do have alternative assumptions here that are described, and I think—well, truthfully, I think if we just accept some of those alternative assumptions it is going to greatly change the NMFS conclusions.

We believe that these assumptions should be discussed in collaboration with the States and tribes.

Senator CRAPO. Thank you.

Mr. Kutchins, you alluded to my next question in your testimony, and so I am going to direct this question to you. It is my understanding that Judge Marsh found in the *Idaho Fish and Game* v. *NMFS* litigation that he wanted the Federal agencies to collaborate with the States and tribes. I think that was part of the court's order, and I think you alluded to at least what you perceived the court to be directing happen there.

Could you tell me whether you believe that that collaboration has occurred? I'm asking this in the context of whether the current collaboration is going to be satisfactory on a legal basis.

Mr. KUTCHINS. It is my guess, when the judge sent everybody back to the drawing board and said, "Work together"—and this is a judge that, in particular, wants people to work together—that I believe, as was stated by the other panelists here, in the first 5 years, 4 or 5 years of that, through this PATH process that was—I think I'd call that collaboration. It was a pretty thorough and exhaustive enclosure of State, tribal, Federal, and even other interested parties all working together.

I wasn't part of it. I used to observe them working when I was working down in Portland.

So perhaps up until the Summer of 1999, when PATH started to get mothballed, it was collaboration.

What intrigues me even more is kind of what happened to the 1995 biological opinion in its entirety, not just PATH collaboration, but the entire opinion, what happened to the 1999 decision, what happened to a variety of other RPAs that were called for in that opinion that were never implemented.

With all due respect, you might be just touching the tip of an iceberg there.

We were very flabbergasted and frustrated when we found out there would be no 1999 decision; that, instead, it would be a new biological opinion. From looking at the draft new BIOP, it appears that the 1999 decision is to continue kind of the status quo, at least in the hydrosystem, and there is not a conclusion of whether to do that or to breach dams, for example, that we were anticipating to come in the 1999 decision.

Senator CRAPO. Thank you.

I just had another couple of questions, and, as usual, we are running short on time, so I'll try to be brief here.

It seems to me that the Governors' recommendations contemplate a careful transition from barging as many smolts as possible to having more of those fish migrate out-river when possible, and the Federal action agencies appear to be steadfastly refusing to move in this direction and to acknowledge this essential consensus among the Governors.

The question I have—and anybody can feel free to pitch in. I guess I'd ask you to try to be as succinct as you can. Is there any new and emerging evidence—or are we relying basically on what we've talked about already—that suggests that the Federal action agencies should listen more closely to the Governors with regard to this issue?

Mr. Weber.

Mr. WEBER. Mr. Chairman, I think that there is some evidence that barging is really not providing very much of a benefit, but I think everyone would agree that, as a general rule, there is a slight advantage to barging, and so I think we need to be a little bit cautious here before we call an end to barging and consider that some kind of solution.

The problem with barging, in my view, is not that it is doing any particular harm relative to in-river fish; it is that it is not providing very much benefit.

The way that it has been justified in the past is through a transport benefit ratio, which you may have heard of, where they measure the survival. Basically, that's where those data come from.

Then they measure the survival of in-river fish and compare that with transported fish. As transported fish do better they say, "Aha, that's good." But the fact is the in-river fish are surviving, in general, no better and probably a little bit worse.

So I think that if we are going to try that approach, it is going to take massive amounts of water, and we're not talking about half a—I've done some simulations. Even 4 million acre-feet, which is probably all you can get, is not going to make a huge difference.

There is a benefit, and I would certainly support flow augmentation in the absence of breaching, but the idea that we are going to get there through additional flows and additional spills probably isn't very realistic.

As others have mentioned, we're talking about an increase of perhaps threefold, at least threefold, to get to survival and recovery, and I don't see that happening through either flow augmentation or even a very generous spill program.

Senator CRAPO. Any others want to comment on that?

Mr. BOUWES. Yes, I'd like to comment on that.

Senator CRAPO. Mr. Bouwes.

Mr. BOUWES. Mr. Chairman, like Earl said, there does appear to be a slight benefit for transportation, but if you look at it more closely it depends on the route of passage that a fish takes over the dam.

If a fish spends more time going over the spillway or, since we don't really know if they are going over the spillway or going through the turbines, simply if we know that they are not detected—i.e., they're not going in the bypass system—they seem to do a lot better compared to fish that go through the bypass system.

We think that this is due to the propensity to have higher survival of going through the spillway, and if we look at those kind of comparisons then we see that there is probably a better benefit to migrating in-river, going through the spillways, and we believe in a spread-the-risk approach, where we don't try to transport all the fish we can get our hands on, but try the spillway approach and then perhaps transport half the fish that were transported and send the rest over the spillway and see if we can gain any improvement that way.

Senator CRAPO. Thank you.

Mr. Bowles.

Mr. BOWLES. I'll try to keep this brief.

I think the key here on the transportation issue is yes, there is both existing and emerging data that indicates the perceived benefits of smolt transportation as head and shoulders above keeping the fish in the river is seriously questioned, and some new information, just preliminary coming out now in the 1997 and 1998 smolt-to-adult survival rates really don't show that benefit much at all, and also show a higher delayed mortality of those transported fish than what NMFS has earlier projected, but that's preliminary information and we need to collaboratively take a look at it, but there is emerging information that seriously questions the effectiveness of transportation.

To me that certainly doesn't mean just pull the plug on transportation and leave all the fish in the river. What it means is that you put your efforts into trying to recreate, as best you can, within policy constraints, those sorts of natural processes in the river that the fish need and don't try to circumvent the river. While you're doing that, while you're trying to make the river a little more friendly, you don't put all your eggs in one basket.

Depending on the river conditions, if it is drought sort of scenario, obviously you are probably going to want to err on the side of more fish in the barges. If it is good water average or better and you're able to make a friendly river environment, then you're going to err on the side of in-river. But certainly don't maximize barging at the expense of in-river conditions.

Senator CRAPO. Thank you.

Mr. Kutchins.

Mr. KUTCHINS. Real quickly, if the fish are doing better in barges, think about what that tells us about the condition of this so-called "river."

Senator CRAPO. Thank you very much.

I do have other questions, but we are also running short on time, so you guys are going to be off the hook at this point.

I want to thank you very much for your preparation and attendance here today and for your attention to these issues and assure you that your input has been heard, and that hopefully we will be able to create an opportunity in the next 3½ months, if not more, to have true collaboration.

Again, thank you very much. This panel is excused.

We will call up our next panel. This would be: Mr. Derrek Batson of the Idaho Salmon and Steelhead Unlimited; Mr. Scott Bosse of Idaho Rivers United; and Mr. Rob Masonis of the Northwest Regional Conservation Programs for American Rivers.

Gentlemen, I appreciate your coming today. I know you were here for the instructions, so try to focus on these lights as well as on your testimony.

Why don't we go ahead and begin in the order which I stated. Mr. Batson, you may go first. Thank you.

STATEMENT OF DERREK BATSON, TREASURER, BOARD OF DIRECTORS, IDAHO SALMON AND STEELHEAD UNLIMITED, NAPA, ID

Mr. BATSON. Thank you, Mr. Chairman.

Chairman Crapo and Senators of the committee, my name is Derrek Batson. I am an officer of Idaho Steelhead and Salmon Unlimited, or ISSU. I reside in Napa, ID.

First, let me say that any time I get east of Senator Crapo's home town of Idaho Falls my knees begin to shake and I feel a little bit overwhelmed; however, it is such a great honor to be part of this important process, I've convinced myself I'll be just fine.

Senator CRAPO. You will.

Mr. BATSON. ISSU was formed in 1984 by a diverse group of businessmen, guides, conservationists, sports fishermen, and concerned citizens from throughout the Columbia River region to restore, protect, and preserve the region's steelhead and salmon resources. So, as you can imagine, ISSU is no stranger to this issue or process.

We know why you, Senator Crapo, and other northwestern Senators care about salmon restoration, because salmon are in your back yard. But why should the rest of you or your constituents care? One reason is because protecting and restoring what were once the world's largest runs of salmon and steelhead, this icon of the northwest, is the right thing to do. But another reason, and one which we believe is important to your constituents, is that most of the rest of the Nation view our area as their national playground. Our wilderness areas, white water rivers, and massive expanses of Federal lands are intriguing to them, and they come to our State by the thousands to recreate in these areas.

In Idaho today, tourism is the No. 2 industry. It is surpassed only by agriculture. A limited steelhead fishery on hatchery-reared steelhead generates over $92 million annually for our State. We have not had a general salmon season since 1978, only 3 years after completion of the lower Snake River dams, but it is estimated that it would equal or exceed the steelhead fishing economy.

So, as you can see, we wear the title of "National Playground" proudly, and restoring salmon needs to be a key part of it.

When your constituents come to Idaho, they deserve to be able to enjoy this northwest icon.

Briefly, allow me to highlight where the Federal BIOP fails the salmon. For the Federal Caucus to separate the mainstream Columbia and Snake Rivers with their hydropower obstructions from habitat is a misnomer. Habitat is habitat, whether it is the Frank Church River of No Return Wilderness or the Dam Choke Reservoirs and the main stream Columbia and Snake Rivers. For the BIOP to focus on the freshwater habitat in the Snake River tributaries while ignoring the Federal dams and reservoir is a prescription for failure.

Idaho's wilderness salmon bedrooms are as pristine today as they were 100 years ago, yet no salmon return. While salmon in the middle fork of the Salmon River, the south fork of the Salmon River, and most other tributaries pass no irrigation diversions, yet the National Marine Fisheries Service wants to focus on screening irrigation diversions.

Granted, it is probably politically non-controversial, but it does nothing to recover wild salmon in these wilderness areas.

The BIOP caps and in some cases reduces fishing when fishing today is a mere fraction of what it was before the dams were built in the lower Snake River. This is the fallacy of the BIOP. It attacks land users and fishermen. Loggers, miners, ranchers, farmers, and fishermen are all victims of Federal dams, but the BIOP continues to punish these victims.

Land use industries sacrificed much to set aside the Frank Church River of No Return Wilderness and the Selway Bitterroot Wilderness to protect salmon and steelhead. Combined, these two wilderness areas comprise the single largest continuous wilderness in the lower 48 States. Fishermen have not kept wild Snake River spring chinook salmon in the Columbia River or Snake River since 1978 or wild summer chinook since the late 1960's. Yet, every wild stock is listed by the ESA.

To do more of the same while ignoring the No. 1 salmon killer—the Federal dams in the lower Snake River—quite frankly, this is inconceivable.

Allow me to give you a quick example of the half-heartedness of the BIOP. Specific performance standards draft BIOP 9–7 through 9–15, agencies are required to meet three overall types of performance standards. First, programmatic. Did the agencies implement the required measures? Did they complete the required analyses? And did they acquire the funding necessary to implement and complete these measures?

Second is biological, population growth rates, and, finally, physical—spawner counts, riparian health, and water quality.

There are only consequences for failure to meet the biological standard.

Here is our take of this. First, the National Marine Fisheries Service has yet to define the physical programmatic standards. This is a major omission at the very heart of the BIOP.

Second, current biological performance standards is based on assumptions and data that do not adequately represent population growth rates for Snake River salmon and does not include other biological factors—for instance, population distribution necessary for their recovery.

Third, specific consequences for failing to meet any of the three types of standards should be incorporated into the BIOP. It is important to emphasize here performance standards are the means by which the National Marine Fisheries Service proposed to make this plan work to restore salmon; yet, in the draft document the performance standards are incomplete, are missing all three types of standards, and there are no consequences for failing to achieve two of the three types of standards.

The Save Our Wild Salmon Coalition has done an outline of the draft recovery plan. I have included it in the material package you now have. I hope you will take time to review it in its entirety.

In closing, let me assure you that ISSU has no agenda just to breach dams. Our agenda is to restore a viable, anadromous resource to the Columbia region, even if it means breaching the lower Snake River dams. We will accept any plan that will assure recovery of salmon to harvestable, sustainable levels. To date we have not seen one that can do that without breaching the lower Snake River dams, nor do we believe we ever will.

Thank you for allowing this time before you. I will answer any questions you have.

Senator CRAPO. Thank you, Mr. Batson.

Mr. Bosse.

STATEMENT OF SCOTT BOSSE, IDAHO RIVERS UNITED, BOISE, ID

Mr. BOSSE. Thank you, Mr. Chairman. I sincerely appreciate your invite to testify today.

My name is Scott Bosse and I am a fisheries biologist for Idaho Rivers United. We are a river conservation group based in Boise that has 2,000 members from Idaho and across the Northwest. We have been working very hard on this issue for the better part of a decade, ever since our founding.

I would like to address three fatal flaws that we see in the biological opinion in the Administration's draft basinwide salmon recovery strategy, formerly known as the All-H paper, and what I will hope to redefine is a three-H paper that outlines recovery measures in two H's.

The first is the premise that because there are now 12 ESA-listed stocks of salmon and steelhead in the Columbia Basin that any and all recovery measures must address all of these stocks at once. In other words, the idea is that the premise that we should have a one-size-fits-all salmon recovery strategy in order to get the most bang for the buck. I think we all heard Mr. Stelle say that yesterday and many times in the past.

This goes against one of the most important things that biologists know about salmon, and that is that each individual stock is uniquely adapted to the river that produced it. That is precisely why the Endangered Species Act protects salmon at the stock level and not at the broader species level.

Saying we should not take out the lower Snake River dams because that would only help 4 out of 12 listed stocks is much like saying we should not do anything to improve air quality in Boise because that will do nothing to improve air quality in Houston or Phoenix. It is simply another excuse for inaction.

The fact is that the four listed stocks in the Snake River Basin face a very different set of hurdles than the stocks in the Columbia River. While most tributary habitat in the Columbia River has been severely degraded by logging, mining, grazing, urbanization, and agricultural development, the Snake River stocks have available to them nearly 4,000 miles of prime spawning and rearing habitat.

Approximately one-third of this habitat is protected within federally designated wilderness areas or wild and scenic river corridors. This habitat is theoretically capable of producing millions of wild smolt that would result in the return of hundreds of thousands of wild adult salmon.

The Administration contends there are four H's that must be addressed in order to develop a comprehensive basinwide recovery strategy. In reality, there are only three: habitat, harvest, and hatcheries.

As Derrek said and as others have said here, hydro does not deserve its own H. Hydro is habitat. Hydroelectric dams in the lower Snake and Columbia Rivers have drastically altered the 465-mile-long migration corridor habitat that Snake River salmon rely on in order to deliver them to the estuary when they were smolts and bring them back to their spawning grounds when they are adults. The dams have transformed what was once a cold, swift-flowing river into what is now a chain of warm, slack-water reservoirs which salmon are not genetically equipped to survive in.

Hydroelectric dams have also inundated 140 miles of main stem spawning and rearing habitat for Snake River fall chinook. By largely ignoring the hydro H and trying to make up for it in the other H's, the draft BIOP essentially writes off this stock. This shortcoming is especially problematic because it is fall chinook that are most sought after by tribal harvesters who have treaty rights that this Administration and Congress has pledged to uphold.

The second major point I wanted to address is the draft BIOP's strong focus on habitat restoration in up-river tributaries and the Columbia River estuary in lieu of the major overhaul in the hydro H that Judge Marsh called for in the *Idaho* v. *NMFS* case in 1994.

Mr. George Frampton, Acting Chair of the White House Council on Environmental Quality, has estimated that expenditures on these two items, alone, will total additional hundreds of millions of dollars above and beyond what is already being spent on Columbia Basin salmon recovery.

A fair question then is: what will this money buy in the 3,700 miles of prime salmon spawning and rearing habitat that lies nearly empty of salmon in central Idaho and northeast Oregon?

What will it buy in the Middle Fork Salmon River drainage, the largest wild salmon refuge left in the Columbia Basin, where there are no hatcheries and the habitat is in better condition than it was 30 years ago and where the spring/summer Chinook that return to spawn face a combined harvest rate of less than 10 percent, more on the order of less than 5 percent?

What will a plan that does virtually nothing to overhaul the hydro H do for these salmon stocks that are almost wholly affected by the dams?

NMFS scientists justify their focus on tributary habitat restoration by saying the best opportunity to increase population growth rates is in the salmon's first year of life, but the science shows Snake River salmon have experienced no significant decrease in egg-to-smolt survival since the construction of the lower Snake dams 30 years ago.

The science also shows that Snake River salmon declines have been similar in pristine streams and equally in badly degraded

streams, in streams of high natural fertility, and in streams of low natural fertility.

The bottom line is NMFS has fundamentally misdiagnosed the most critical problem facing 4 out of the 12 listed Columbia River stocks by largely ignoring the hydro H and trying to pin the problem on first year survival. The facts clearly do not support this assumption.

Finally, I want to point out that the remedies prescribed in the draft biological opinion are not time sensitive for at least two out of the four listed Snake River stocks, those being spring/summer chinook and sockeye. That is, restoring spawning and rearing habitat, even if that was the most critical factor affecting these stocks, would undoubtedly take decades to bear fruit, when extinction models show some of these stocks have only until 2017 before they functionally go extinct.

The fact remains that the only recovery measure that is likely to restore spring and summer chinook within a timeframe that will beat the extinction clock is breaching the four lower Snake dams.

Speaking at a July 27 press conference in Portland, Mr. George Frampton was quoted as saying, "We know dam breaching is the single most effective thing we can do for these Snake River stocks and that it may be necessary." I believe that, in addition to being the most effective thing we can do, dam breaching is also the only major thing we can do to actually recover Snake River stocks before the extinction clock runs out.

Until the Administration's draft recovery plan acknowledges that basic fact, it is a recovery plan for just 8 out of the 12 listed stocks, and a rather weak one, at that.

Senator CRAPO. Thank you, Mr. Bosse.

Mr. Masonis.

STATEMENT OF ROB MASONIS, DIRECTOR, NORTHWEST REGIONAL CONSERVATION PROGRAMS, AMERICAN RIVERS, SEATTLE, WA

Mr. MASONIS. Good afternoon, Mr. Chairman.

Thank you for inviting me to testify before you today regarding the Administration's draft plan to save Columbia and Snake River salmon.

My name is Robert Masonis, and I am the northwest conservation director for American Rivers, a national river conservation group of over 30,000 members. I am also the chairman of the board of the Save Our Wild Salmon Coalition, which is a coalition of over 50 commercial fishing associations, sport fishing groups, fishing-related businesses, and conservation organizations from across the Northwest.

Let me start by stating that we believe the general framework set forth in the draft biological opinion represents a workable, logical approach to addressing this extremely complex issue. While we support this general framework of action and adaptive management, we believe that the draft biological opinion is severely lacking in several critical respects, including the adequacy of the specific remedial actions and the implementation timeline.

I will explain these concerns in more detail in a moment.

I would also like to acknowledge the efforts of the National Marine Fisheries Service scientists who have worked over the last year on the cumulative risk initiative. They have made significant contributions to our understanding of the current tenuous State of Columbia and Snake River salmon and steelhead. Their work has shown that many of the listed stocks are at a high risk of extinction in the short term and that we must move forward with aggressive, effective actions if we are to get these stocks on the road to recovery before it is too late.

But the draft biological opinion suffers from several deep flaws that must be remedied if it is to pass scientific and legal muster.

First, the draft biological opinion largely ignores the extensive sound analysis of the team of Federal, State, and tribe scientists known as PATH. There are other witnesses who have testified here today who are better equipped to address the crucial differences between CRI and PATH and the failure of the draft biological opinion to adequately address PATH findings, so I will not cover that same ground here. But it is abundantly clear to us that, during the last year, the National Marine Fisheries Service has largely taken the science in-house and failed to adequately consult with the other Federal, State, and tribe scientists, including those who are part of PATH.

Consequently, in several critical areas NMFS has substituted its own scientific judgments for those of the PATH scientists without analysis, demonstrating that the PATH findings and judgments were flawed.

Second, the aggressive, non-breach recovery actions the Administration has touted as a cornerstone of the draft biological opinion are, in fact, not there. Instead, the document sets forth laudable objectives, promises tough performance standards, and then sets forth a list of actions that consist mostly of studies, investigations, pilot projects, and planning processes. Remarkably, the hydropower system measures are essentially the same as those set forth in the 1995 biological opinion, with no hard flow requirements and a continued reliance on fish barging, a practice which has been roundly and deservedly criticized by the region's scientific community.

For example, proposed measures include a 2-year study by the Bureau of Reclamation to determine the extent of unauthorized water use in the basin, and a 5-year draft feasibility analysis of potential changes in existing flood control operations to aid salmon. These purportedly "aggressive" actions will not save one fish in the near term, and may not ever.

Our point is not that these steps are not worthy of pursuit. They are. But they are not measures that will boost listed stocks. Such actions would include requiring adequate flows in all tributaries containing spawning habitat, or requiring sufficient flow augmentation to provide for the migratory needs of salmon and steelhead. The final biological opinion must require implementation of such actions in a timely manner dictated by the needs of salmon and steelhead.

Third, the draft biological opinion fails to define recovery levels for the listed stocks. Of course, the adequacy of the proposed actions cannot be determined without first determining what is necessary to achieve recovery, as required by the ESA. It also bears

emphasis that it is recovery that the region's four Governors have defined as the goal, not merely avoiding extinction. This fact is routinely ignored in the debate.

The final biological opinion should rectify this major flaw by setting forth an aggressive schedule for defining recovery goals for each of the listed stocks, and then adjusting the biological opinion, as needed, to achieve those goals.

Fourth, the draft biological opinion fails to provide for timely implementation of lower Snake River dam bypass should other recovery actions either not be implemented or prove inadequate. The current time line puts off a decision on bypassing the lower Snake River dams for at least 8 years, and implementation would be closer to 15 years out. That is inconsistent with the needs of Snake River salmon and steelhead.

The cumulative risk initiative—this is NMFS' process—projects that Snake River spring/summer chinook and fall chinook populations will be half the size they are today in less than 5 and 10 years, respectively, if current trends hold.

There is no dispute that bypassing the four lower Snake River dams is the single best recovery action for Snake River stock, and it must, therefore, be available if and when the fish need it. To make that possible, the final biological opinion must contain a firm commitment to completing all preparatory work for dam removal no later than 2005, and a requirement that the action agencies seek authorization from Congress at that point if Snake River stocks are not firmly on the path to recovery. To do otherwise would be to ignore the best scientific evidence and greatly increase the risk of extinction for Snake River stocks.

In closing, American Rivers and the Save Our Wild Salmon Coalition are committed to working with the National Marine Fisheries Service and other Federal agencies to remedy the deficiencies in the draft biological opinion. The necessary changes do not require new analysis or modeling, but rather can be made based on available information developed by PATH, CRI, and other credible sources, and should be completed no later than the end of the year. There is absolutely no excuse for further delay. Columbia Basin salmon and steelhead need strong, effective recovery measures now if we are to realize our collective goal of recovering healthy, harvestable stocks.

Thank you.

Senator CRAPO. Thank you very much, Mr. Masonis.

Recognizing that you would not necessarily be representing States or tribes or whatever in the collaborative decisionmaking process, I would like to ask each of you—and you have each, to some extent, already touched on it, but I'd like to ask you more specifically what your perception is with regard to whether the Federal Caucus—in particular, NMFS—has been conducting true collaboration with the region and the various interests with which it is required to collaborate in the region over the last couple of years.

Mr. Batson.

Mr. BATSON. Well, I'm no scientist. Like I said, I'm a simple fisherman that has a real study of the issue. It appears to me that what happened is that when the PATH project was brought about

there was collaboration, and as this PATH, to steal a phrase, headed toward breaching as the option, then the National Marine Fisheries Service bolted. As it got closer to the way to an end—you know, when the Oregon Fish and Game and the tribal authorities are saying, "Well, it looks like that's where we're headed," it appears to me that the NMFS people bolted and then go through this very, very long process of trying to study the thing to death.

I believe that there is true collaboration, and they really got in on it. I believe the message they are going to have to hit and down the road they are going to have to look at breaching, and it appears to me they took that off the table 10 years down the road when, as Mr. Masonis touched on, we need to start acting now.

This is a four-H paper. I'm going to add my own H, and that's Hope. I hope very soon we get action and not words. I believe that, just in my perception, that is kind of what has happened.

Senator CRAPO. Thank you.

Mr. Bosse.

Mr. BOSSE. Mr. Chairman, I think the fact that State and tribal and independent scientists often call me at my office to see what NMFS is up to speaks for itself.

Senator CRAPO. That would be very telling.

Mr. BOSSE. It is awfully disturbing, because for many, many months—for many years, as a matter of fact—we were told by virtually everyone in the basin that PATH would be the most rigorous scientific modeling effort ever undertaken anywhere, just wait to see what the science says. We've heard that at every level. All of a sudden the science said something and it disappeared. It's almost like there was a coup.

Nothing very big was made of it, and it is very, very disappointing to me, because, after observing that PATH process very closely I was very impressed by it. It was rigorously peer reviewed by virtually everyone, including industry, including the Corps of Engineers, the National Marine Fisheries Service, virtually every party involved in this debate. It fulfilled Judge Marsh's order and the spirit of his order in 1995, and it is very disappointing that it has not happened today.

Senator CRAPO. Thank you.

Mr. Masonis.

Mr. MASONIS. Thank you, Mr. Chairman.

We recognized this problem, American Rivers did, last winter, and, consequently, I called up the National Marine Fisheries Service scientists working on CRI and asked them if they would join us in co-sponsoring a workshop that was held on March 29, 2000 to deal directly with this issue, which is that we have the PATH scientists, the States, the tribal fish and wildlife scientists who, at that point, had, you know, halfway into the CRI process, essentially had no real input and obviously had divergent views on some critical issues.

So we did convene that workshop, and a number of the scientists came up to me afterward and remarked that they thought it was the best one that had taken place to date because there was actually some interaction.

Unfortunately, I don't think we saw, subsequent to that particular workshop, much progress in terms of opening up the CRI

analysis and modeling effort to input, as the previous panel testified to.

So I don't think there is any doubt that there is a significant problem, has been a significant problem with collaboration, meaningful collaboration, in the CRI process.

However, I do want to also emphasize that this is not an indictment of CRI, per se. I think there is some good work that has happened in that forum. But the work is not adequate, and there are some critical flaws, and the only way for those to be remedied in the next couple of months is to do what you have proposed, Mr. Chairman, which is that these folks get together and hammer them out.

Senator CRAPO. Thank you.

In the context of what needs to be done in the next couple of months, could each of you also give me your definition of "collaboration"? What is it? I'm going to ask another follow-on question with regard to the requirements of the litigation, what Judge Marsh had required, and whether we are going to achieve that. But what is it that needs to happen in terms of the next 3½ months?

Mr. Batson.

Mr. BATSON. There, again, my observation is that this polarization of these two scientific entities as the National Marine Fisheries Service and the State agencies, if it takes locking them in a room for a while and getting some hard answers out of it—I mean, maybe that's not how things are done in Washington. I don't know. But it would seem to me they need to sit around and ask the hard questions.

As I said, time is critical. That's the sad thing about this. Without it, it may not do any good. So, like I said, I guess my suggestion would be lock them in a room and throw away the key.

Senator CRAPO. All right.

Mr. Bosse.

Mr. BOSSE. I would agree with some things that were said earlier, that obviously the National Marine Fisheries Service needs to hammer out these differences with the States and the tribes in a very sincere fashion and answer the very serious doubts that the States and tribes have about that CRI model.

I would also say that it would be constructive to have the Independent Scientific Advisory Board take a look at this CRI science and take a look at the draft biological opinion that has been released by the National Marine Fisheries Service, not redo the science, not create a new model, but answer some very key questions that the States have, that the tribes have, and that we as a conservation and fishing group community have. I think that would be very constructive. They've conducted that similar role in the past.

I also think that your idea of having some regional hearings in the Northwest would be a very good one, and I would like to see the people that helped design those models and the people that wrote that draft biological opinion answer these questions.

Senator CRAPO. I think that's a very good idea. In fact, we've already concluded, I think, that we need to get a forum, probably in the Northwest if not here, where the technical experts can really get at it. We had hoped to maybe try to get at that yesterday, but

it just didn't work out yesterday in terms of where the direction of the hearing went with regard to things. But that's a good suggestion.

Mr. Masonis.

Mr. MASONIS. Mr. Chairman, to be very specific about this, in answer to your question, I think that next week this collaboration needs to begin in earnest, and there needs to be a very large block of time and resources committed to working through, on a face-to-face basis, these issues. These are not issues that are going to be resolved at more CRI workshops, a couple of them between now and the end of the year, nor is it going to be resolved by allowing the States, tribes, and Federal Fish and Wildlife Service scientists to submit comments.

This is going to be hard work. It is going to be contentious. It needs to be done, and it is going to require a significant commitment of time and it should start now.

Senator CRAPO. Thank you.

As a followup—and I won't ask all three of you to answer, I'll just give you each an opportunity if you choose to—well, let me ask one other quick followup.

Mr. Bosse, as I was thinking about what you said—and actually all three of you—are you telling me that the CRI has not yet been peer reviewed?

Mr. BOSSE. To my knowledge, the very serious questions that have been asked by the States and the tribes and others have not been adequately answered nor have they been verified by an independent scientific body. That's correct.

Senator CRAPO. Anybody disagree with that?

Mr. MASONIS. Mr. Chairman, no. I would just add that the approach I think that CRI has taken, because this is an initiative that started only a year ago, is that they are—the scientists are producing work that they are submitting for peer review for journal entry, but the process, as a whole, as far as I know—and I may be wrong—has not been peer reviewed.

Senator CRAPO. I'll just make an editorial comment at this point. It just strikes me as a little surprising that we are going to have a draft biological opinion that appears to be based on something that hasn't even yet been per reviewed, and that's another way of getting at what we've all been saying here today, is that I think we now have a really short fuse to get some major things done.

I assume that all three of you were here yesterday or listened yesterday and heard the testimony of Mr. Stelle. In one of the questions I asked him with regard to CRI, or with regard to the commitment for collaboration and where we could head on that, my recollection of what he said in part was that, with regard to the science, that NMFS was very willing to engage in a collaborative process and listen to concerns and so forth, but I heard a proviso there that said, "However, we have our science models and our science models have to be followed, or somehow proven to need reformation or change in order to be then followed."

But what I heard him saying was he was raising a strong proviso that, you know, science has to guide you, but also that the science that was going to guide was the current science that was being utilized for the draft biological opinion.

First, I would ask if you got the same impression. If so, what does that tell us in terms of what we need to achieve between now and the end of the year?

Does anybody want to pitch in on that?

Mr. MASONIS. Mr. Chairman, I'll jump in here.

What caught my ear was his insistence that the collaboration be successful, which begged the question in my mind of what does that mean.

It cannot mean to accept the National Marine Fisheries Service's assumptions in all of its models with their flaws. That is hardly a collaboration. There needs to be a willingness to make adjustments based upon the collective expertise of the scientists in the region, which is what PATH was designed to provide.

So I don't think we are going to be able to make much progress on these really difficult issues if the ground rules are such that you can kind of tweak it around the edges but, you know, ultimately the judgments and assumptions being used by the National Marine Fisheries Service scientists will win.

Senator CRAPO. Thank you.

Anybody else on that?

Mr. BOSSE. I would add that both American Rivers and Idaho Rivers United and the Save Our Wild Salmon Coalition have already sent a letter to the National Marine Fisheries Service asking for independent peer review by the Independent Scientific Advisory Board. I think that would be a very constructive step.

But I must say the joke amongst State, tribal, and independent scientists right now is that the best available science is no longer available. I think that says something about almost an ideological insistence that their model is the only model, and that perception needs to change in a hurry.

Senator CRAPO. I agree. I see that as a potentially very big hurdle.

Let me get to the question I had on the court case. In terms of the whole dynamic that we've just finished discussing, what does all of this mean with regard to Judge Marsh's order in *Idaho Fish and Game* v. *NMFS* with regard to the required collaboration? If you don't feel like you are in a position to evaluate legal issues, I understand. I just am curious about what your perspective might be on that if you do have one.

Mr. MASONIS. Mr. Chairman.

Senator CRAPO. Mr. Masonis.

Mr. MASONIS. I will try to address that.

I think that Judge Marsh's concern in requesting that collaboration is that the decision be informed by the best available science. That is the crux of this issue, which is: is the best available science informing this decision?

The fact that there has not been, in the last year or so, effective collaboration in which these very significant issues have been resolved brings that into question. But ultimately, you know, that is what the judge is going to be looking for if this biological opinion appears before the court.

Senator CRAPO. Thank you.

I want to shift gears here for just a moment. We've been talking a lot about whether there is the right science and procedure behind

the actions of the National Marine Fisheries Service. I want to shift gears and talk a little bit about the ultimate policy decision that has to be made in terms of the guidance here.

Mr. Kutchins in his testimony said that he thought that NMFS may be doing what properly is a role of Congress, which is going beyond the actual science and actually looking at how the policy decision has to be made.

In my opening statement yesterday I pointed out that I believe that we've got to have the best available science, but we also can't ignore the fact that we have economics and cultural and spiritual and other values to be measured here, and that ultimately there will have to be a balance achieved in this context.

I am also aware that where I personally have come down in terms of how I see that balance coming out is not where any of the three of you have come down with regard to it.

So we still have this arena beyond the science debate of where do we go with policy. The question I would like to ask you is: I recognize that each of you, if you were able to make the policy decision, would breach the dams. I assume you recognize that I have opposed that step. Assuming for the moment that we are going to deal for the next 8 to 10 years with a scenario in which we are not breaching the dams but that the current broad guidance or broad approach of the biological opinion in that context is followed, are there things that we can do short of breaching the dams that do focus on the hydrosystem and do focus on the main stem issues, where the smolt-to-adult survival issues are so critical, that can help?

What I'm seeking here, as a policymaker, is just guidance on what you feel we can do in these arenas, if there are options where we can take action.

Mr. Batson.

Mr. BATSON. Initially, Mr. Masonis touched on it, that if you don't—they need action now. I suppose that would be the biggest part. There are so many other parts of this that need to go into place. If you study this for another 5 years without doing anything, that certainly can't help the fish. Those are great decisions.

Second, you know, maybe there will come a point down the road where the science is refutable and maybe you'll change—you know, political will might change. I understand that it is not there now.

But, you know, I understand that there's families, there's people on this river system whose lives would be changed if these dams are ever breached, and there is, as far as I know, no committee or policy looking for some sort of mitigation down the road. I'm not saying it has to happen. I'm just saying, as slow as things seem to move, we might as well get started now looking for some sort of economic mitigation down the road.

We talked yesterday a little bit that Senator Slade Gorton seems to be really adamantly opposed to this, even to the point of trying to attach riders to delay things even more, and that just seems to me that none of that is helpful. I mean, maybe not breach the dams today. You know, I understand that it is going to take a political will to make that happen.

But, like I said, this is my first time to Washington, and I see how things kind of move here. You need to get started now.

Senator CRAPO. Thank you.

Mr. Bosse.

Mr. BOSSE. Thank you, Mr. Chairman.

I agree wholeheartedly with you that there are many things we can do right now to conserve these salmon, and I choose the word "conserve" very carefully because there is a very big difference between conserving these stocks and recovering these stocks.

I think the science does show that we can get some very minor incremental benefits, but certainly do all we can to keep what we have by taking certain measures.

I gave a briefing paper to Governor Kempthorne just last week while at Redfish Lake releasing some sockeye outlining some of the things that we shared support of.

I think the general concept of restoring normative river conditions is something that all of the science has shown we must do, and that means a true spread-the-risk strategy where we don't put 85.3 percent of all the fish in barges and trucks, like we did this year, under a purported spread-the-risk policy.

Senator CRAPO. Which the Governors have generally moved toward.

Mr. BOSSE. Absolutely. In the State of Idaho, certainly from Governor Batt to Governor Kempthorne, and also with the other three Governors in the region.

I think the reason we are transporting all these fish, if you look at this year, is that we have some of the worst migration conditions in the lower Snake River that we've ever recorded. We achieved flow targets that the National Marine Fisheries Service set in its last biological opinion 20 out of 144 days this year. We're not just missing flow targets frequently, we're missing them by so much it's not even funny. If the target is 50 yards away, the arrow is landing 3 feet away from the person that's firing the arrow.

We can also put irrigation screens on diversions that remain unscreened. In Idaho, for instance, in the Lemhi River, the Pasimari River, the Upper Salmon River, there are many unscreened irrigation diversions.

We can reduce predators in the lower Columbia River estuary. We can reform hatchery operations so that wild fish are not as negatively impacted as they currently are. We can increase in-stream flows in places like the Lemhi River in Idaho where the very few and very expensive fish that return to spawn are looking at 11 CFS of water in the Lemhi River.

So there are a lot of things we can proceed with now, but for long-term recovery versus conservation some time we have to address the bigger issue and, of course, that's where we may differ right now. I hope we're on the same side of the debate the next time I come to Washington.

Senator CRAPO. Well, thank you. We will continue to engage in that debate, I'm sure.

Mr. Masonis.

Mr. MASONIS. Mr. Chairman, if I understood your question, you were referring specifically to the main stem and the hydrosystem and what we can do short of breaching.

Senator CRAPO. Yes, but feel free to be flexible on just what we best need to do.

Mr. MASONIS. Well, I think Mr. Bosse touched on a number of the issues that encompass not only the main stem but also the tributaries.

As far as the main stem Snake River goes, a true spread-the-risk approach, which would reduce barging, as the Governors have stated they would like to see, involves other actions, necessary complementary actions. As Mr. Bowles testified on the last panel, there are river conditions that exist now because of inadequate flows that make the river a rather lethal migratory corridor.

In order to change that, that means we are going to have to significantly increase flows and we are going to have to spill more water. Those things are all inter-connected—barging, spill, flow augmentation—so those things need to be given very serious consideration.

The other thing I want to point out is with regard to fall chinook, which Mr. Bosse addressed earlier. The fall chinook are main stem spawners. They need the Snake River. Right now the only stretch of fall chinook spawning habitat in the Snake River is below Hell's Canyon Dam. A Bonneville Power Administration funded study that was recently conducted by the U.S. Geological Survey and Patel that looks at main stem spawning habitat concludes that the only way to recover fall chinook is to increase available main stem spawning habitat. That habitat is buried beneath the four lower Snake River dams, and the upstream habitat is blocked by Hell's Canyon. There are two fundamental choices there.

It is interesting to note that the existing small stretch of spawning habitat below Hell's Canyon Dam, when they run it through their models, shows that zero spawners would use that habitat. That shows you how resilient these fish are that they are able to take advantage of something that naturally they would ignore in their spawning migration, but it also shows you how dire the need is to make very significant changes so we have a normative river in the Snake River.

Senator CRAPO. Thank you very much.

I just have one more question, and, like usual, we are running short on time here.

You heard yesterday a lot of talk about the need to build consensus. Frankly, I think that the Governors' effort is the best thing we've seen so far in terms of finding a path forward to get to consensus on the issue.

In that context, Governor Kempthorne said yesterday—and he said it much better than I will rephrase it, but he said that he didn't think that we could implement any effective salmon strategy if we don't have at least a basic consensus in the region to move forward on that strategy.

I agree with that. Said another way, the best science available might say to do X, but if X is going to be so economically or culturally or in other ways divisive to the political community that resides in the Pacific Northwest, I'm not sure that it is achievable.

Mr. Batson and Mr. Bosse and you, Mr. Masonis, have all indicated that perhaps that political dynamic can change as information becomes available and options become expanded, or as we try other things and see how they work, and so forth. I think every-

body needs to be flexible in terms of evaluating where we have to head on this.

But in that context, I'd just like your brief observations on what you believe the proper role of consensus is in the region.

Mr. BATSON. I believe that it is not this Federal Caucus versus the four Governors' plan. I think that is very divisive. I think that as people read this, the more information they have, if you bring out the facts, I believe that people will make their own decisions.

I read a poll done by Boise State University that 40 percent of the people favored breaching, 40 percent were opposed, and 20 percent were undecided. That's real no one side really trying to lead the other. I just think that's people discovering the issue and making up their minds.

When they see the NMFS plan say one thing and the Governors' plan kind of says another, I believe that that throws a real divisive curve into this process of educating people on this issue.

Senator CRAPO. Thank you.

Mr. Bosse.

Mr. BOSSE. Mr. Chairman, yesterday I made a visit to Representative Nethercutt's office, and, as you well know, those four lower Snake dams are in Representative Nethercutt's District.

Senator CRAPO. Right.

Mr. BOSSE. He is very opposed to removing them.

I met with his staffer, and the tendency in this debate has been to argue the science and argue the science, and everyone, even who is not a scientist, likes to be an armchair biologist. When we do that, I find that we get nowhere. So what I tried to do yesterday is I tried to change the conversation to, "What economic impacts make some of your constituents opposed to removing these dams?" Once we started talking about those very real and legitimate concerns, we had a productive conversation, because everyone has said in the region, everyone has said in the hearings, every politician, from Senator Gorton to you name it has said we want to save salmon. We all know that. The problem lies in the economic impacts of these various recovery measures.

I think that the framework that the Administration has laid out in its draft biological opinion is workable. I think one of the positive things about it is it is adaptive management. It relies on trying some of the easier—politically easier and economically easier—alternatives first, and then, if they do not work, and we are sincere about restoring these fish, then we address dam removal. But it is a wise and prudent recommendation of theirs that we begin the economic transition and engineering studies now, and it serves no one to attach a rider onto an appropriations bill that precludes that from happening. That is not bargaining in good faith.

Senator CRAPO. Thank you.

Mr. Masonis.

Mr. MASONIS. Mr. Chairman, I think that there is obviously a need for consensus to have action on this important issue to northwesterners, and really to the Nation, but what we cannot do—and I agree largely with Mr. Bosse on this—we cannot try to seek a consensus on the science, because we never will. Truly, a consensus where everybody agrees to everything is not going to happen.

What we need to do is act on the best available science, and the best available science should set the sideboards for that debate as to what management actions to take.

With that as guidance, I think we need to look at the individual management actions, and I'm going to stress the same thing that Mr. Bosse stressed, which is looking at the economic impacts associated with dam removal and making a sincere effort to develop transition and mitigation plans to deal with that.

Our opinion at this time—and it hasn't changed over the years—is that the best available science says remove the Snake River dams if you are going to save these fish.

The region needs to embrace that challenge, the economic challenge, and embark on a course that is constructive. Unfortunately, to date the debate has been so polarized, and because of the lack of clarity on the scientific issues we have not been able, despite our best efforts, to launch that constructive dialog, and we're looking for leadership to help us do that.

Senator CRAPO. Thank you, Mr. Masonis.

I thank the entire panel. These issues are so critical and so intriguing that we could continue this for hours, but we have one more panel that needs to get up here, and so I will excuse you at this time.

Again, we appreciate your input. We will continue to work on this.

We'll call up our next panel now, which consists of: Ms. Sara Patton, who is the coalition director for the Northwest Energy Coalition from Seattle; Mr. Norm Semanko, the executive director and general counsel for Idaho Water Users; and Mr. Glen Spain, the Northwest regional director of the Pacific Coast Federation of Fishermen's Associations.

We welcome all of you here with us today. Thank you for your patience. You are the last panel, but that doesn't mean that your input is any less needed or important than others. Again, I thank you. I guess you get the benefit of having listened to what everybody else had to say and got asked, so maybe you'll have a bit of an opportunity to be more prepared.

I would like to, without any further ado, just begin in the order that you were introduced.

Ms. Patton, you are welcome to proceed.

STATEMENT OF SARA PATTON, COALITION DIRECTOR, NORTHWEST ENERGY COALITION, SEATTLE, WA

Ms. PATTON. Thank you.

First, I want to thank you, Senator Crapo, for asking us to testify and allowing us to testify on this issue that is of such importance to the people and the economy and the environment of the northwest.

Senator CRAPO. You're welcome.

Ms. PATTON. My name is Sara Patton, and I am the coalition director of the Northwest Energy Coalition. The Northwest Energy Coalition endorsed bypassing the four lower Snake dams in order to restore salmon and replacing the power from those dams with clean energy in November 1998.

I want to talk a little bit about who the Northwest Energy Coalition is before going into the reasoning behind that endorsement.

The Northwest Energy Coalition is an alliance of nearly 100 member organizations in Idaho, Washington, Oregon, and Montana. It includes utilities, and those utilities include Emerald People's Utility District and Seattle City Light, both of whose governing boards have endorsed taking out the four lower Snake dams, replacing the power with clean energy, and mitigating the economic impacts on the communities affected.

Our other members—lots of public interest groups spanning a broad spectrum, including environmental groups, good government groups, low-income groups, consumer groups. We even have a couple communities of faith and one sports fishing member group. We also have energy efficiency businesses and renewable energy developers.

This is a diverse membership but it is united around a desire for a clean and affordable energy future for the Northwest.

So the first question that the Energy Coalition faced in dealing with whether to endorse taking out the four lower Snake dams was the first one that you have been dealing with today. Does the science demand bypass in order to restore these magnificent fish? The Coalition board was convinced, indeed, that the science does demand that.

The second question was: can we replace the power with clean, affordable energy from conservation and clean renewable resources. There are many members of the coalition which care just as much about water and air and climate change as they do about salmon, and they are not willing to tradeoff restoration of salmon for the pollution of air and the global climate change, so this is a very important question.

The third question was, of course, mitigation for the affected communities, and the Coalition was convinced that you can do that, you can mitigate. It is worthwhile. It is affordable. We should be going forward with finding out what those measures are and how much they cost.

But, going back to the question of clean and affordable energy to replace the power from these dams, we looked at it. We worked with the Natural Resources Defense Council, and I included in my testimony at least the preface, brought along a copy of "Going with the Flow: Replacing Energy from Four Snake River Dams," and that study answers in the affirmative, yes, we can replace power. We can replace the power with clean energy and conservation renewables, and that power will cost no more than it would cost to replace the power from the market.

In addition, we will still in the Northwest have power which is below market cost, as we are lucky to have today.

That combination of measures is about 82 percent energy conservation and 18 percent renewables.

I'm not going to go into the details of exactly how much it costs and where it comes from and where the conservatisms are in that study. Those are in my written testimony.

I will say that we are looking at strong work going forward on conservation and renewables. Right now we've got about 350

megawatts of wind generation being developed in the Northwest and about 60 megawatts of geothermal. That's good news.

I also want to talk a little bit about timing. We have an energy crisis right now in the Northwest and on the west coast, and so this is a pretty important question with regard to power and taking out dams which provide power.

I am going to say that the very earliest possible time that we could be looking at taking out the dams is 5 years. I think other people would tell me I'm crazy for making it that short a period of time. But, regardless, I'm saying 5 years because 5 years is plenty of time to be able to produce the kind of power that we need to replace the power from the dams, and I want to tell you about some of the things that are going forward right now in order to do that.

On the conservation side, utilities like Seattle City Light and Emerald and others are working hard to actually put into place, deliver the energy conservation that is available. Seattle City Light has been delivering six average megawatts a year of energy conservation. It is planning to go to 12, to double its effort.

For example, BPA is working through its conservation and renewables discount and its conservation augmentation to do that, and Oregon and Montana both have some strong commitments to investment in energy conservation through their deregulation legislation.

I've talked a little bit earlier about the geothermal and wind that is going forward.

The other thing that is going forward at a very remarkable clip is the development of gas-fired combustion turbines.

There is a new rush to gas. There are over 10,000 megawatts cited or proposed in the region right now, and about 3,000 are expected within the next 1 to 5 years. The 270 megawatt plant, Rathrum Plant, is one of those ones that is expected to be available fairly quickly.

We will be working to push for the first priority to be given to energy conservation and to renewables. We will also be working to look for mitigation opportunities for the gas combustion turbines that are bound to come in.

The conclusion I think is that there are plenty of resources being developed by the energy community right now, so that by the time we come to a dam decision the issue of whether there is enough energy will just not be an issue.

I do want to say just a little bit more about the current electricity market problems.

We were appalled that BVA reduced spill three times at least this summer—in California, for the wildfires in Montana taking out the coal strip lines, and for our own regional energy problems.

It is pretty clear that the power suppliers in the Northwest and in California have been asleep at the wheel for at least 5 years, and the fish paid the price, and that was wrong.

We are mending that now, but there are a lot of difficult months ahead. I think this is important for two reasons. One is that the cost pressures that California saw during this crisis are going to light the fire, re-ignite the fires that will cause them to consider once again pushing to move BPA from at-cost prices to market

prices, and they'll use that. We can certainly see that that's one more reason that we need to avoid salmon extinction, which is another cost that would go on to taxpayers and would give more fuel to that fire to take away one of the big economic drivers of our region.

The other thing I wanted to mention about that is that the biological opinion—it is important to have a strong, clear biological opinion for the power managers in the region. They've got enough uncertainty to deal with, and we need one that will guide them and they'll know when and if they need to replace the power in the four lower Snake dams.

With that, I will be happy to answer questions.

Senator CRAPO. Thank you.

Mr. Semanko.

STATEMENT OF NORM SEMANKO, EXECUTIVE DIRECTOR AND GENERAL COUNSEL, IDAHO WATER USERS, BOISE, ID

Mr. SEMANKO. Mr. Chairman, my name is Norm Semanko and I serve as executive director and general counsel for the Idaho Water Users Association. The association was formed in 1938 and represents about 300 canal companies, irrigation districts, public and municipal water suppliers, individuals, and agri-businesses. We are also affiliated with the National Water Resources Association, which I serve as the board member from Idaho and also as their Federal Affairs Committee chairman. We do appreciate the opportunity to testify today.

We understand the focus of this hearing to be two-fold. One is an examination of the science upon which Federal officials are relaying in writing their salmon recovery documents, and, No. 2, a determination of the extent to which the Federal Caucus has collaborated with States, tribes, and others in drafting these documents.

I will address both issues.

Idaho water users necessarily focus their attention on a specific set of issues pertaining to flow augmentation from the upper Snake River Basin. While the 12 species of salmon and steelhead that are listed under the ESA exist only downstream, as you well know, Mr. Chairman, of the upper Snake River, our part of the State has been called upon to contribute almost half a million-acre feet of water each year toward flow augmentation during the migration season of the salmon, particularly in the summer months.

NMFS continues to call upon Idaho to supply this and additional water from U.S. Bureau of Reclamation reservoirs in the draft biological opinion. This is water taken directly from reservoirs which Idaho irrigators and other water users have relied upon and used for most of the past century.

Mr. Chairman, the science is in on this issue, and it shows that it is a failed experiment. The augmentation using water from the upper Snake River Basin does not work. NMFS' continued reliance upon flow augmentation is without adequate scientific support and needs to be discarded from future salmon recovery discussions.

In a recent white paper on flow augmentation, the Federal Government's own scientists—distinguish that from their policymakers—their own scientists have indicated that flow augmenta-

tion really doesn't work. Additional research on the topic by others, including the State of Idaho and our own scientists and researchers yields the same result. The information has been well documented and provided on several occasions to NMFS and other Federal agencies. Many examples can be provided to demonstrate how futile the flow augmentation experiment has been.

Most astounding perhaps is the simple hydrologic fact that adding even increased amounts of flow to the lower Snake River would only increase the velocity of the water by 1/10 of 1 mile per hour at Lower Granite Dam.

For this vain effort, we are spending taxpayer dollars and putting our economy and way of life at risk. It is only a matter of drought years coming, and we will feel the pain of providing this water.

To date, this information has been ignored by the political decisionmakers in the Clinton Administration who find it more expedient to continue this failed program than to discontinue it.

Idaho water users have participated in this experiment for the past 10 years, waiting for proof that flow augmentation works. Mr. Chairman, we are still waiting.

To their credit, the Governors of the four Northwest States recently called upon NMFS to document the alleged benefits of flow augmentation. Draft amendments to the Northwest Power Planning Council's fish and wildlife program call for the same documentation, including a determination of the precise attributes of flow augmentation that provide any meaningful benefit to the listed species.

We are proud of Idaho Governor Kempthorne's leadership role, the statement that he made yesterday, and in taking this important step, the first important step toward debunking the myth that flow augmentation using Idaho water can somehow save the fish. We know it cannot, and I have not heard anything different today.

Flows from the upper Snake have slightly increased over the past 85 years, especially during the critical months, despite irrigation development in southern Idaho and the construction of the upper Snake project. The simple reason for this is that we store the water in the winter and early spring and we release it in the summer, and it doesn't take a lot of intelligence to figure out that there is more water in the river because of that, even though we are depleting some of the flows to provide irrigation.

The scientific documentation for these conclusions is summarized in figures one through six, which are included in my prepared statement.

It is worth noting here, Mr. Chairman, that the flows at Lower Granite have been about 31,000 CFS, on the average, over the last 84 years. NMFS has set flow targets between 50 and 55,000 CFS at Lower Granite. It makes absolutely no sense.

There is no scientific foundation for the conclusions in the draft BIOP regarding flow augmentation. It does not provide any benefits.

We have provided one more chart that we'd like you to look at, and that's No. 7, figure seven of my prepared testimony, and it shows the minuscule contribution—the little black bumps at the bottom of the last page in my prepared testimony—the minuscule

contribution of the upper Snake flow augmentation when compared to the entire flow of the Columbia Basin, the Columbia River.

NMFS has said that flow augmentation helps from the upper Snake for the lower Snake, for the lower Columbia, and for the estuary, and you can see from that chart, alone, that that has no basis in fact.

Mr. Chairman, by presenting this information I hope we have given you some idea of the degree to which the science used by the Federal agencies fails to support the conclusions regarding flow augmentation in the draft salmon recovery documents. We'd appreciate anything that you could do to bring this information to the light of the Federal agencies.

On the other topic, Mr. Chairman, from our perspective the Federal agencies involved in salmon recovery, particularly NMFS, have failed to collaborate with interest groups such as ours in drafting these important documents. We have taken very seriously the task of reviewing this information and providing data to NMFS. We have taken virtually every opportunity to provide written detailed comments to NMFS on draft documents and analyses. To date, our concerns have been ignored. In some cases, as with our comments on the draft All-H paper, they have not been acknowledged at all.

If the goal, Mr. Chairman, is to develop a regional plan by consensus, the Federal agencies have failed miserably. Anything that this subcommittee can do to correct this situation would be greatly appreciated.

I do want to caution you, Mr. Chairman, though that this type of collaborative process needs to include everyone in the region. If that is done by having all of the interest groups, the States, and the tribes at the same table, that's great. If it happens with the four Governors through the process that they have initiated, that works, too. But we need to do something to get a true regional consensus. NMFS is not doing it for us.

Thank you again for the opportunity to testify. I do look forward to the future hearings that will be held on this. I've talked to a number of other interest groups in the region. They have looked forward to that opportunity and they have a lot to say, as we do, about not only economics but also the science that has gone into the decisions that NMFS is making.

Thank you.

Senator CRAPO. Thank you, Mr. Semanko.

Mr. Spain.

STATEMENT OF GLEN SPAIN, NORTHWEST REGIONAL DIRECTOR, PACIFIC COAST FEDERATION OF FISHERMEN'S ASSOCIATIONS, INC., EUGENE, OR

Mr. SPAIN. Thank you, Mr. Chairman.

Since I am the last speaker and I'm kind of low on the food chain, I'm going to cut to the quick here.

We're commercial fishermen. We're family food providers. We harvest the bounty of the sea and the bounty that comes from our rivers. That bounty in the Columbia has steadily decreased over the last 40 years, and the final nail in that coffin, I am afraid, was the construction of the four lower Snake dams.

There is a huge, huge cost of doing nothing. That cost has been borne by lower river communities, it has been borne by rate-payers, it has been borne by taxpayers. In mitigation measures, alone, it is well in excess of $4 billion, with no end in sight, to keep doing the same wrong things over and over. They obviously have not worked or we would not have virtually every stock in most of our basin listed under the Endangered Species Act. But it has also seriously impacted coastal communities and lower river communities.

We represent commercial fishermen, not only in the Columbia River but as far south as San Diego and as far north as Alaska. We are the west coast's largest organization of commercial fishermen.

These stocks, when they get to the estuary, they swim north and they swim south. They are the limiting factor now and have been for over 15, 20 years in several major fisheries. Although there are a lot of hatchery fish out there, we can't catch them because we cannot impact beyond certain caps these weakest stocks from the Columbia River.

The Columbia River declines have also been the major precipitating factor in the international crisis with Canada that has been temporarily resolved. We have obligations under international law to Canada to continue free passage of fish from the Columbia, but there first have to be fish from the Columbia to get there.

We cannot continue trying to replace wild fish with hatchery fish. Hatchery fish need the same river, the same habitat, which is seriously degraded all the way from the watersheds at the top in your State and beyond, on down to the estuary.

We have serious problems throughout the system, and it has impacted our people enormously. I think we need to appreciate that.

However, that means that an investment in recovery can bring back into the economy as much as $500 million a year every year in lost economic benefits that are now gone from the economy. This includes roughly $100 million from the Idaho economy, primarily steelhead fishing, and roughly 5,000 jobs in the Idaho economy that were fishing dependent that are not there or that will soon disappear.

This is also an offsetting benefit for making the investment in a good plan that works.

Now, our organization's interest is in restoring these runs. I have struggled, as you have struggled, to try to grasp the science, to try to deal with the policy issues, to try to find any way we can save these fish short of the breaching of the Snake River dams. We remain very skeptical that we can offset the 88 percent mortalities in the dams, as the draft BIOP already indicates, in the Snake River with the remaining 12 percent from other sources, but we are willing to give it a try. We have always been willing to give it a try.

My view, frankly, of the BIOP is the framework is there, but it is just a skeleton. We need to put some meat on it before it is going to get up and walk.

We are going to have to have some specific details as to what gets done, who gets to do it, how much it is going to cost, and when it has to be done by. Specifically, there are some systemic flaws in the BIOP that need to be corrected, and quickly. One is lack of spe-

cific performance standards. We don't know what the goal is. Until we know what the goal really is in terms of runs, numbers of fish, restoration goals over time, we have a difficult task ahead of us ascertaining whether we're even meeting those goals.

We need detailed measures on how to reach those goals. Right now there is a lot of good language there, but it is very general and vague. The Administration admits this. It is a draft. But once you've got the goals, once you've got the measures to reach the goals, then you have to cost it out and see who is going to pay for it and how much it is going to cost.

We do not have that necessary detail in here. In fact, my understanding is that the Office of Management and Budget was asked for those numbers and they threw up their hands saying, "This is too vague. We cannot put price tags on any of these measures unless the measures are actually specific."

We also need check-ins much more frequently. We'll know within 3 years whether Congress, which is the prime performance standard here, is going to fully fund these measures.

If Congress does not do that, or if people start cherry picking, as I understand is what is contemplated with various riders—block this, take this, whatever—the whole tapestry here is going to unravel pretty quickly.

I am much more afraid of that than that we do these various measures and in terms of the cost, because the alternative are far worse. This is the only game in town right now. This framework has to be made workable or we have chaos in the region.

As you are well aware, the whole Federal hydropower system in the region is right on the verge of serious chaos in the courts, chaos among various interest groups. There will be renewed calls for divesting the government of BPA altogether. We may have Treasury payment failures. All of these are at risk right now until we have a plan.

As to the consensus, I think we have the beginnings of a consensus. We have about 90 percent convergence between the BIOP's framework and the Governors' framework. I think we can go that extra 10 percent pretty readily, but again we have to do the details.

Finally, we have to we have some decision points. We cannot avoid making decisions. The cost of doing nothing is mounting as we speak. The economic dislocation in agriculture, in transportation, in power, in fishing, in down-river fishing communities, to fishing communities from central California, and all the way up to Alaska is mounting. We have these problems that we have to prevail against, and the only way we can do it is with the best available science.

In terms of one of the suggestions, I am astonished, as you are, that the CRI, the guts of this whole plan, has never been peer reviewed. I'm astonished that the agencies have not taken advantage of the Independent Science Review Board that is already there, created by legislation with recognition of the need for better science. At least they should be asked to peer review, and I would ask you, as chairman of this committee, to require them or request them to peer review the CRI and its fundamental assumptions because, as you know, it is garbage in/garbage out. You can have the best

model in the world, but if your assumptions are flawed you get nowhere and you get no results.

My Papa always used to warn us, "Never spend more money doing the same wrong thing over and over if you can avoid it. Sit down and think it through first and try to do it better." I think we can do it better, and I think we really must do it better, not only for your people and your constituency but for my people and my constituency—who, by the way, are more than happy to work hand-in-hand with your committee, with upper river irrigators and interest groups, to work through mitigation, if necessary, and to work through alternatives if possible.

I certainly pledge to you our efforts, as a coast-wide fishing organization, to work on those issues with you personally and with committee members.

I want to emphasize one other thing, and that is that there are four elephants in this room. We are addressing but one. The other three are the Clean Water Act; tribal treaty obligations, which the courts, including the Supreme Court, take very seriously; and the Northwest Power Planning Act. Those we have to address in other forums, perhaps, but we must keep in mind that we have to address all four or we are going to have a lot of broken china in the room.

Thank you.

Senator CRAPO. Thank you very much.

To the entire panel, I appreciate your comments, just as we have each of the other panels.

Ms. Patton, let me start with you. I appreciate the supplemental information you provided, as well, from the "Going with the Flow" document, which I will review carefully, but I want to ask you a couple of questions in that context.

If I understand your testimony right, it is that, from your analysis and the study that you have provided, that the energy losses from decommissioning the dams could be replaced. Is that accurate?

Ms. PATTON. Absolutely.

Senator CRAPO. At below cost prices?

Ms. PATTON. At below market cost prices.

Senator CRAPO. At below market cost prices.

Ms. PATTON. Yes.

Senator CRAPO. In that analysis, is that primarily relying on gas-generated electricity, or—I know you listed a number of other options there, but my understanding in the past has been that the economics weren't there for them to be really viable replacement alternatives. Are those becoming economically viable as replacement alternatives, or is it really the gas-generated electricity that is the focus?

Ms. PATTON. This study was looking specifically at comparing a conservation and renewables package to a market package. The market package—I had the numbers in there, but it was primarily over 80 percent gas-powered combustion turbines, and the remainder I expected to come from coal. That was the package that BPA put together as the part of the draw-down regional economic workshop part of the EIS.

Senator CRAPO. OK.

Ms. PATTON. BPA put together that package using their models and said that was what the market would supply if BPA went out and went to the market for that power.

So we were using that as our definition of market and looking to find out if we could find a combination of conservation and renewables that would meet that requirement and be at or below that cost, and we did.

Senator CRAPO. That is in this document?

Ms. PATTON. It's in this document. In fact, what has happened of late is that the cost of gas-powered combustion turbines has started to climb pretty precipitously with the increase in the cost of gas, the doubling of gas prices, and we're not totally real concerned about the pipeline capabilities and what we're looking at there, which means that you start adding costs. Right now the market price that the Power Council has used for—the Power Council did a new conservation potential assessment for the city of Seattle, and they are also putting together a new marginal value coming out of their regional technical forum work, and they are using a market value of about $0.04 to $0.041 a kilowatt hour, which is much higher than the one we used for this.

What the effect of that is, is that if you have a higher marginal value more conservation measures become cost effective.

Senator CRAPO. Right.

Ms. PATTON. So you have a larger resource than we were looking at that's cost effective.

Senator CRAPO. Review briefly with me those conservation measures, just to refresh my memory.

Ms. PATTON. Well, they are the ones that everybody is familiar with—putting insulation in your attic and getting a more efficient washer/dryer, those kinds of things that we all use in our everyday houses.

Senator CRAPO. Right.

Ms. PATTON. But, in fact, a lot of this potential comes from commercial and industrial conservation, things like having more-efficient heating, ventilation, and air conditioning in commercial buildings, more-efficient lighting. Lighting is a huge energy use in commercial, and there are lots of ways to improve that to make it more efficient.

In industry there is an enormous amount of potential, from better motors, more-efficient motors, and more-efficient heat processes, and also from the same things that you find in commercial, the same lighting and heating and ventilation and the air conditioning, and a lot of that potential comes there—a lot of it is very inexpensive, and a lot of it is less than $0.02 a kilowatt hour.

In fact, the potential assessment that the Power Council did for Seattle City Light service territory found—and they continue to do conservation, one of the few utilities that stuck with it through thick and thin.

Senator CRAPO. Right.

Ms. PATTON. Yet, still in the future the Power Council analysis said there was between 180 and 240 megawatts of conservation at $0.02 a kilowatt hour or below that was achievable in the Seattle area.

If we had a new regional conservation potential assessment, I think we'd find that these numbers are very conservative in terms of what is cost effective.

Senator CRAPO. If you are looking at $0.04, then it even——

Ms. PATTON. Yes.

Senator CRAPO [continuing]. Becomes more reasonable.

Ms. PATTON. Absolutely.

Mr. SPAIN. Mr. Chairman, could I offer a real-life example?

Senator CRAPO. Go ahead.

Mr. SPAIN. The utility district in Eugene, OR, where I live invested a few years ago in a Wyoming wind farm. I get 100 percent of my power from that wind farm. My rates went up about 40 percent over standard rates, but I also used a BPA-funded conservation program to insulate the house, put in double-pane windows, things that are required under modern construction anyway but weren't 40 years ago. My house leaked a lot. Now my power costs are 30 percent below the average for my neighbors.

Senator CRAPO. Even though you may be paying a higher rate?

Mr. SPAIN. I'm paying a higher rate, but conserved over 50 percent of the overall kilowatt hours because of the conservation program, 80 percent funded by BPA several years ago. That funding program has disappeared. Most conservation efforts are no longer funded by BPA or through utilities because BPA doesn't make that money available.

Ms. PATTON. But luckily we are starting to again.

Mr. SPAIN. That is a serious, serious problem.

Senator CRAPO. So you have an example right here at the table, Ms. Patton, of what you are talking about.

Ms. PATTON. There are many examples, and great examples from industry and business.

Senator CRAPO. I don't know if it is in your testimony or in the document that you provided, but do you have information that shows the current economic cost of, say, solar power or wind power as opposed to gas production or hydro production or the like? Do you have something that compares the cost of all those? I realize that changes.

Ms. PATTON. I cited some of those numbers in the testimony. I was just getting from a friend at Enron an analysis of gas combustion turbines that said if you are under 250 megawatts it is about $0.037 a kilowatt hour; if you are over, you can get as low, they think, as $0.031 a kilowatt hour. That's bus bar. That's not yet delivered.

Senator CRAPO. Right.

Ms. PATTON. So there are still some more things to add on to that.

Right now there is a big planned wind project called the State Line Project. It is 200 megawatts on the Washington side of the river and 100 on the Oregon side of the river. It is an expansion of the current VanSickle project. That's by FPL. They are expecting to come in in the mid $0.03 range on that wind because it is a big economies of scale.

The average for wind is between—and I've got this. I want to make sure that I get—the price range for wind has been from $0.04

to $0.06. We're hoping to see that go down with the economies of scale, obviously.

For geothermal, from $0.045 to $0.07, so we're getting close. Depending on what happens with natural gas, if it keeps going up——

Senator CRAPO. Then you could see some opportunity there for economic sense to make these shifts.

Ms. PATTON. Right, as well as if we find that we're willing to make the serious investments that we need to make in mitigation, CO2 mitigation, in order to make those gas plants safe for our whole globe.

Senator CRAPO. All right. Thank you.

Mr. Semanko, I'm going to save you for last, since you're from Idaho. I'm going to go to Mr. Spain next.

Mr. Spain, as I listened to your testimony, you answered most of my questions as you proceeded, but I want to make sure that I clarify what I understand you to be saying with regard to the BIOP.

I understand the defects that you identified and listed, and I think those are similar to many that have been raised, but, in fact, in the latter part of your written testimony you indicated that a number of political leaders have stated that they believe that all other feasible measures throughout the whole system should be tried before resorting to decommissioning the dams, and that both politically and administratively that makes sense.

So you agree then with the idea that we've got to see if some of these other things will work before we take the major step of decommissioning dams?

Mr. SPAIN. I do, but there are a couple of caveats here.

We have spent well over $4 billion trying to do things there to help fish and wildlife, and all the easy things have been done. Technical fixes to the dams, many of them have been done. Some have been tried and they failed. We have some concerns about what more can be done there.

We can certainly do a lot more for down-river habitat and estuary habitat, particularly. Will Stelle's and NMFS' assessments—and I agree with these assessments—are that we've lost roughly 90 percent of the salmon productivity in the lower estuary below Bonneville. We could do much better there.

There are clearly areas where tributaries need some cleanup. There are some screens problems. As you know, Senator Wyden and others have a bill to provide money for screens in, unfortunately, way too many unscreened diversions in the Columbia and elsewhere.

We can do all of those things. The question that remains is, since each of those will give us a little increment and we are dealing within that 12 percent mortality for the Snake River runs, whereas the Snake River dams, according to the BIOP's own numbers, provide up to an 88 percent mortality, can we piece together enough benefit to offset the problems and—the chart was up there—bring that up above 2 percent survival. The 2 percent is replacement. To get to recovery you need to get much higher than that. To prevent it getting worse you need to get to 2 percent. Right now we have been on the order of ½ of 1 percent, or less, for years.

I think we can try a lot of things. As you point out, even if the decision were made today to breach the Snake River dams, it would take years to do it. Until that happens, there is a lot we can do. In addition, the BIOP, I think rightly, addresses the fact that there are eight listed runs that have nothing to do with the Snake River. They are Columbia River main stem runs.

In order to address the needs of those other fish, we still have to do work in the estuaries, and we can get some bang for the buck for the Snake River out of that, too, so it makes sense to do the stuff that we can do aggressively, do it right, do it based on the best available science, do it efficiently, and do it as quickly as possible to try to get that benefit, and monitor the results, hoping that we can avoid the much-more-difficult, much-more-divisive, as you point out, problems around breaching of the Snake River dams.

Senator CRAPO. Do you agree generally with the testimony that we've heard from a number of the other witnesses in these 2 days of hearings that the focus of the BIOP right now may be a little too much in those other areas and not enough on the main hydrosystem?

Mr. SPAIN. I think that is likely right. When we are barging in excess of 80 percent of the smolts, as happened this year, we can't continue doing that and say we're doing a spread-the-risk strategy. We can't continue doing that without looking at other ways and other alternatives, particularly since we know there is an immense, unquantified but large delayed mortality from those programs.

We also know that it is a lot more expensive than leaving the fish in the river to begin with to take them out of the river, put them on a truck, drive the truck to a barge, take the barge downriver, and off-load them. That's all Federal money. If we leave them in the river to begin with, we don't have to do that.

Senator CRAPO. All right. Thank you.

Mr. Semanko, you indicated in your testimony that flows have generally increased in the Snake River over the last 85 years, and largely that's due—I assume you mean during the summer and fall—spring, summer, and fall timeframe?

Mr. SEMANKO. Mr. Chairman, the period that we look at most critically is the 75-day period, the summer migration that NMFS requires that those flow targets be met.

Senator CRAPO. OK. So you're talking about the very—that's what I wanted to get at—you're talking about the timeframe which is when the fish are in the river?

Mr. SEMANKO. That's true, although if you look at the records for the entire year as an average, that holds true for the entire year, as well.

Senator CRAPO. OK.

Mr. SEMANKO. It goes down slightly in the spring, up slightly in the summer, and overall for the year it is up slightly.

Senator CRAPO. All right. I assume you've provided that information to NMFS?

Mr. SEMANKO. We have, and in much more detail than we've provided it to you, and we'll be providing the subcommittee with a copy of the comments that we are submitting to NMFS again on this topic.

Senator CRAPO. Good. I do find fascinating the charts you provided. I'm looking here at figure seven, which is the one that you referred to at the end of your testimony. I wish everybody could see this. It's a little small, but it basically shows the flows in the entire Columbia River and—let's see, the Columbia River at the mouth and the Snake River at Hell's Canyon; is that correct?

Mr. SEMANKO. Yes, and then the flow augmentation that is provided.

Senator CRAPO. So that shows the total flow, and then it shows what part of that flow is provided by the flow augmentation that is being asked from Idaho's up-river irrigators and others, water users. The chart is dramatic. It shows that it's just a little blip on the screen, basically, in terms of the magnitude of the water that is flowing in that river, which explains why those additional flows don't do much to increase speed of travel in the river.

Now, I assume you provided this graph also to NMFS?

Mr. SEMANKO. We have.

Ms. PATTON. What did they tell you?

Mr. SEMANKO. They don't really have a response to it. The response to date has been that it provides some—Will Stelle's answer is the best answer I can give you, that it provides some incremental benefit, and if you start using the rationale that, well, this doesn't really help, and you apply that to every measure that they are trying to implement around the region, all of a sudden the biological opinion from 1995 falls apart, and we can't proceed that way. That's the best answer he gives. He doesn't really or they don't really address the data that we've provided them.

Senator CRAPO. Have you had an opportunity to collaborate with them—in other words, to sit down—my definition would be, in your case, to sit down at a table with them with your scientists and these charts and this information and to get their scientists and their analyses and to see if you could find some common understanding as to what the science is showing?

Mr. SEMANKO. Mr. Chairman, the short answer to that is, "no", We've made great efforts to try to meet with folks in the Federal agencies. We have been able to meet on occasion with people at the Bureau of Reclamation, the regional office in Boise, but getting past that, getting our information to NMFS and sitting down with them and discussing it is another matter altogether, and we have not been successful in having that occur.

Senator CRAPO. You've listened to the testimony over the last couple of days, haven't you?

Mr. SEMANKO. Yes.

Senator CRAPO. Do you agree that during the next—I assume you agree that during the next 3½ months we have an important collaborative effort to undertake.

Mr. SEMANKO. I agree, Mr. Chairman. I, myself, wonder if the massive type of collaboration that we're talking about can happen in 3½ months, or perhaps whether the four Governors' mechanism that's out there wouldn't provide a better vehicle.

As we talked about several years ago on the other side of the Hill at another hearing, there have been other instances where Governors have been given authority to act in ESA matters, and the one that comes to mind is when Fish and Wildlife Service signed

a cooperative agreement with the three Governors in upper Colorado Basin and said,

> You folks go ahead and figure out a way to solve this problem, and as long as it is within some broad parameters we're not going to give away our authority under the ESA but we're going to let you go ahead and run with the ball.

If we had that kind of model in the Pacific Northwest to allow the four Governors to not only to come up with a plan that they hope someone is going to read, but to actually say, "Here's what the four Governors agree to, and as long as it is within some broad parameters scientifically we're going to run with that," I think that's something that we could achieve.

We've begun that process, I think, thanks to Governor Kempthorne's leadership, but we are not quite there yet. We've just begun to develop a skeleton, I think.

Senator CRAPO. Thank you. You also testified that a number of other interest groups were very anxious to provide their input, and I want to again state that I am aware of that and wish we had a third day that we could do this right now, but we will be holding further hearings and that input will be provided.

As I say, you've listened to the last couple of days comments on the science issues. Do you have an objective or a perspective on the science being utilized by NMFS right now versus the science that had been seemingly in the collaborative process that was existing before?

Mr. SEMANKO. You know, Mr. Chairman, I'm not a biologist or a scientist. What I will tell you, though, is that I attend a lot of the meetings where these things are discussed, and you do owe it to yourself and to the subcommittee to hear from some other people. PATH is not, from what I understand, the be-all and the end-all of the science. There are a lot of other models and science that's out there that you need to listen to.

I know the discussion about the so-called "d-factor" and delayed mortality is the key factor. It's an assumption. I understand whether you assume it one way or the other dictates whether the conclusion from any of the models is to breach or not to breach, and I can't tell you which one of those is right. All I can tell you is that there are other people in the region who have feelings about that, and you should hear from them.

Senator CRAPO. I appreciate that input, and we will hear from them.

Mr. SEMANKO. Mr. Chairman, I might mention that, when you first announced these hearings, you mentioned that you would have several hearings, so nobody has ever questioned that. We fully believe that this is going to be a long and contentious process. It has been going on for a number of years, and it is not going to get solved in one hearing.

I also wanted to mention, since I am qualified to answer legal questions, that this question about Judge Marsh's opinion in *Department of Fish and Game* v. *NMFS*, I was able to attend the hearings that Judge Marsh had in *American Rivers* v. *NMFS* in 1995 and 1996, and he commented that, under the Endangered Species Act, as has been alluded to here today, there is no requirement for the Federal agencies to, in essence, come to an agreement with Federal or with State and tribal or other entities. He did,

though, say that in his previous opinion he had said it is not reasonable for NMFS to proceed without considering—and in the case of *Idaho Fish and Game* v. *NMFS* they were not considering the input from the State and tribal biologists.

So I think that that pushed the region toward having a collaborative process, but the sad fact is that ESA does not require NMFS to come outside of that black box at that point. If anything, they've done more than they are probably required to up until the last year or so when they've gone back behind closed doors.

Senator CRAPO. I think you've identified one of the concerns that I have with the overall Endangered Species Act process in that there is no formal requirement for collaboration, yet on issues, particularly issues such as significant as this and as large as this, I think the political reality is if we don't have collaboration that we'll simply have gridlock. That's one of the things I think we have been experiencing in the Pacific Northwest for years now.

I appreciate once again all of you on the panel coming forward today and your effort and concern on these issues. Please continue to keep us informed, and we will continue to go out and take testimony and hear from all perspectives until we have it fully evaluated, and hopefully provide the kind of oversight that Congress can, as this process proceeds, to encourage the Federal agencies to proceed in a way that will help us move toward a consensus-based path for recovery.

Once again, I thank everybody for coming. This hearing is adjourned.

[Whereupon, at 3:40 p.m., the subcommittee was adjourned, to reconvene at the call of the chair.]

[Additional statements submitted for the record follow:]

STATEMENT OF NICOLAAS BOUWES, BIOMETRICIAN, OREGON DEPARTMENT OF FISH AND WILDLIFE

BACKGROUND

Current management of the hydrosystem is guided by a Biological Opinion on 1994–1998 operation of the Federal Columbia River Power System and its supplement for listed steelhead (1995 Biological Opinion). The 1995 Biological Opinion contains specific measures for operating and improving the configuration of the hydrosystem in the near term. However, it deferred decisions about the long-term future operation and configuration of the hydrosystem until late 1999, when it anticipated the completion of a formal and deliberate assessment of three general alternatives. The decision about the long-term future state of the hydrosystem was deferred until 1999 because of significant uncertainties associated with the projected likelihood of survival and recovery of listed fish under each option.

This assessment, referred to as the Plan for Analyzing and Testing Hypotheses (PATH) was shaped by Federal District Court orders arising from a challenge of the legal adequacy of the Biological Opinion on the 1993 operation of the Federal Columbia River Power System (1993 Biological Opinion) by the Idaho Department of Fish and Game and the State of Oregon, joined by four treaty Indian tribes. They argued the chosen jeopardy standard and the consideration of the reasonable and prudent alternatives (RPAs) to avoid jeopardy were arbitrary and capricious and otherwise not in accordance with the purposes of the Endangered Species Act (ESA). The District Court agreed and set aside and remanded the 1993 Biological Opinion and records of decision to the Federal defendants with instructions that they review and reconsider them. Rather than reconsider the challenged 1993 Biological Opinion, the Federal defendants opted to reconsider the newly issued 1995 Biological Opinion. The following District Court orders guided their efforts:

1. NMFS must consider relevant facts and articulate a rational connection between the facts found and the choices made. These choices included the choice of a standard, for which the District Court expressly rejected any attempt to impose

bright-line definitions of survival and recovery. Instead, the District Court stated that, with respect to listed Snake River salmon, survival and recovery are virtually indistinguishable.

2. NMFS must conduct a reasoned evaluation of all available information. The District Court found that NMFS arbitrarily and capriciously discounted low range assumptions without well-reasoned analysis and without considering the full range of risk assumptions. This was particularly problematic given the enhanced risk associated with the small size of listed Snake River salmon populations.

3. NMFS must substantively consider significant information and data from well-qualified scientists such as the fisheries biologists from the States and tribes. The District Court directed NMFS to provide analysis and reasoned evaluation of submissions by such qualified scientists, with any rejection of such submissions thoroughly explained.

4. NMFS must provide sufficient reasoned analysis of its consideration of alternatives and measures [for operation of the hydrosystem] to permit judicial review.

In response to the District Court's findings, NMFS agreed in a Joint Statement of the Parties, filed with the Federal Report of Compliance, to several coordinating principles. Three of these principles are particularly germane to the purpose of PATH and led to its development.

1. NMFS, for development of its hydrosystem biological opinion concerning the listed salmon, will use a regional analytical work group, including State agencies and the Columbia River Inter-Tribal Fish Commission, to provide technical analysis of biological parameters affected by fish passage through the hydrosystem and impacts on other portions of their life cycle.

2. The Federal action agencies or NMFS will provide State agencies, tribal governments, and others as they deem appropriate, with a reasonable opportunity to provide new scientific and technical information on a draft biological opinion(s).

3. Federal power system operators, the U.S. Fish and Wildlife Service (FWS) and NMFS will provide State agencies and tribal governments and others with an opportunity to meet to discuss the analysis of the expected effects of proposed actions in biological assessment(s) and biological opinion(s) before final decisions are made. In this regard, the Federal action agencies, FWS and NMFS will make available to State agencies and tribal governments and others documents containing data, analysis, and other information upon which the biological assessment and biological opinion rely.

The PATH process was developed through a collaborative process and adopted by NMFS in 1995 to provide a biological framework for decisions concerning the listed Snake River salmon and steelhead, and most PATH analyses were completed in 1998. The PATH forum is an inclusive, regional analytical work group[1] developed to provide technical analyses of biological parameters affected by fish passage through the hydrosystem and impacts on other portions of their life cycle. The PATH analyses evaluated factors responsible for the decline of ESA listed Snake River salmon and steelhead (retrospective analysis), and described a range of possible responses to alternative management actions (prospective analysis). The range of population responses to each management action described the ability and uncertainty in meeting the 1995 ESA jeopardy standards developed by the Biological Requirements Work Group (BRWG). In a memorandum from Randall Peterman, a world-renowned fisheries biologist reviewing the PATH process, to the NMFS chaired Implementation Team, stated "it is fair to say that the PATH process, is the most comprehensive analysis of alternative hypotheses and management options that I have ever seen, heard about, or read about."

The PATH retrospective analysis concluded that the most likely factor responsible for the decline of Snake River spring/summer chinook was the development and operation of the lower Snake River hydrosystem. PATH found that the management action most likely to improve Snake River salmon survival enough to meet the jeopardy standards over the greatest range of hypotheses, was breaching of four lower Snake River dams. The improved hydrosystem operations and increased transportation options did not meet the jeopardy standards over the majority of hypotheses evaluated.

In 1999, NMFS announced their intention to delay the 1999 Biological Opinion to 2000. NMFS also announced the beginning of their new analytical process, the

[1] PATH participation was broadly represented by as many as 25 scientists from State, tribal, Federal, and private institutions including NMFS, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Army Corps of Engineers, U.S. Forest Service, Bonneville Power Administration, Columbia River Inter-Tribal Fisheries Commission, Idaho Department of Fish and Game, Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, Columbia Basin fish and Wildlife Authority, University of Washington, and other private firms.

Cumulative Risk Initiative (CRI). In the Lower Snake River draft Environmental Impact Statement, NMFS stated in their Anadromous Fish Appendix, that "The CRI approach cannot replace PATH's detailed examination of modifications of transport or fish passage systems, and is not intended to do so." Instead, NMFS has stated that they elected to move away from the PATH process to the NMFS' CRI process because they needed a tool flexible enough to evaluate the impacts of hydro, habitat, hatcheries, and harvest on all listed stocks. We agree that these additional analyses are necessary; however, the established PATH process could have addressed these needs if the Implementation Team, who assigned PATH their analytical tasks, had deemed them necessary. In addition, PATH made considerable progress in investigating the improvements that might be expected from habitat restoration, alternative harvest reductions, and estuary mortality reduction in much greater detail than has been attempted by CRI. In the draft Biological Opinion, NMFS' has ignored the PATH findings and has relied on the CRI for the Snake River listed stocks and the Quantitative Analysis (QAR) for the mid-Columbia listed stocks. The CRI only evaluated "modifications of transport, or fish passage systems" and harvest for the Snake River listed stocks. Therefore, CRI is not used for the purposes NMFS has given to abandon PATH, but only to "replace PATH's detailed examination." The draft Biological Opinion should include a description of why the PATH process and their findings that were meant to provide the analytical basis for the 1999 (2000) Biological Opinion were abandoned in exchange for what NMFS admits is a less "detailed examination".

REVIEW OF THE DRAFT BIOLOGICAL OPINION

A great deal of effort has been made by Oregon Department of Fish and Wildlife to understand the 700 pages of draft Biological Opinion that describes the analytical approaches and rationale developed for the future operation of the FCRPS to ensure the survival and recovery of the 12 listed ESU salmon and steelhead. This review occurred over the last 6 weeks, and in general we are concerned that the conservation burden of the Federal hydropower system has not been adequately defined and has been inappropriately assigned to harvest, hatcheries, and habitat programs. The States and tribes should not shoulder the mitigation responsibility of the Federal hydropower system, nor should the responsibility be shifted from the mainstem to the tributaries and estuary without a full accounting of what limits the ability of the hydropower system to meet its mitigation responsibility. The following comments highlight shortcoming of the draft Biological Opinion that has led us to this conclusion.

In general, the BiOp:

1. *Overestimates* probabilities of survival and recovery for listed salmon and steelhead
2. *underestimates* survival improvements necessary to ensure the survival and recovery of listed salmon and steelhead
3. *overestimates or, for some measures, does not estimate* improvements to survival resulting from implementation of the Reasonable and Prudent Alternative (RPA)
4. *describes* an RPA for operation of the Federal hydropower system that does not significantly change the status quo
5. *does not adequately explain* whether the success of the RPA can be confidently described by proposed performance standards and measures after 5–8 years
6. *does not anticipate and have ready* an alternative RPA, if the proposed RPA does not produce survival improvements necessary to ensure the survival and recovery of listed salmon and steelhead.

Specifically:

1. The BiOp overestimates the probability of survival and recovery for listed salmon and steelhead because analyses are based on optimistic assumptions.

(a) *Optimistic assumptions.*—The BiOp evaluates jeopardy using only those assumptions that present an optimistic view of the status of listed salmon and steelhead. Assumptions used in the BiOp are not based on the weight of evidence. Nor, in the absence of evidence, are they conservative, i.e. they do not avoid placing undue risk on the listed species.

(b) *Extinction threshold.*—The BiOp evaluates jeopardy using the probability of an absolute extinction of 1 fish/brood. In reality, populations are at significant risk of extinction well before abundance declines to 1 fish/brood. The National Marine Fisheries Service (NMFS) points this out in their description of Viable Salmonid Populations (McElhany et al. 2000). The Biological Requirements Work Group (BRWG) that NMFS formed to set threshold population levels for survival and recovery of listed salmon and steelhead also points this out. Using an absolute extinction of 1

fish/brood as the survival threshold under-estimates the probability of real extinction for the listed species.

(c)*Definition of high risk.*—The BiOp evaluates jeopardy by defining high risk as a 5 percent probability of extinction in 24 and 100 years. This is inconsistent with the definition of high risk previously described by NMFS in the Anadromous Fish Appendix of the US Army Corps of Engineers' Environmental Impact Statement for juvenile fish passage improvements at Federal projects in the lower Snake River. In the Appendix, NMFS defines high risk as a 1-percent probability of extinction in 100 years. Relaxing the definition of high-risk under-estimates the probability of real extinction for the listed species.

(d) *Base time period.*—The BiOp evaluates jeopardy using a base time period that only includes stock status information for the years after the Federal hydropower system was constructed. The evaluation also uses stock status projections (returns that have not occurred) through 2004 in an attempt to reflect affects of recent good ocean conditions. By not including years before construction of the hydropower system, and by including stock status projections for future years, the BiOp under-estimates the decline in population abundance coinciding with construction of the hydropower system, and also over-estimates the probability of survival and recovery.

(e) *Population summary statistic.*—The BiOp evaluates jeopardy using a metric for population growth that assumes a linear decline in population levels. Evidence suggests that declines in population levels are non-linear (Oosterhout 2000). In failing to correct for a non-linear decline, the approach over-estimates the probability of survival and recovery.

(f) *Hatchery effectiveness.*—The BiOp evaluates jeopardy based on the assumption that hatchery effectiveness is low. Evidence suggests that hatchery spring and summer chinook that spawn in the wild in the Snake River may be as effective as wild spawners. Assuming hatchery effectiveness is low over-estimates the productivity of listed stocks, and consequently, over-estimates the probability of survival and recovery.

(g) *Density dependence.*—The BiOp evaluates jeopardy based on the assumption that there is no density dependence, i.e. that populations can grow exponentially without limit. This assumption may be reasonable at low population levels, but not at population levels that approach recovery. Assuming no density dependence over-estimates productivity, and consequently, the probability of recovery.

2. The BiOp underestimates the survival improvements necessary to ensure the survival and recovery of listed salmon and steelhead.

(a) *Necessary survival improvements.*—Because the BiOp bases its evaluation of jeopardy on optimistic assumptions that over-estimate the probability of survival and recovery, estimates of the necessary survival improvements are too low. Consequently, the BiOp concludes that to meet the 24-year survival standard, necessary survival improvements for Snake River spring and summer chinook are less than 30 percent over the life-cycle. This is an order of magnitude less than estimates of over 740 percent by Peters and Marmorek (2000) and of 280 to 850 percent, based on smolt-to-adult ratios needed to meet the 24-year survival standard used in the 1995 Biological Opinion.

(b) *Delayed mortality.*—The BiOp evaluates jeopardy, for some stocks, using a "full mitigation" standard that is equivalent to survival through a natural river. This full mitigation standard was calculated based on the assumption that there is no delayed mortality of fish traveling through or transported around the Federal hydropower system. This assumption is not consistent with the direct evidence that delayed mortality exists and the indirect evidence that delayed mortality is substantial (NMFS 2000, Bouwes 1999, Schaller et al. 1999, Marmorek and Peters-SRP 1999, Marmorek and Peters 1998, Marmorek et al. 1996). Assuming no delayed mortality under-estimates mortality related to the Federal hydropower system, and consequently significantly lowers the full mitigation standard. This, in turn, underestimates the survival improvement needed to meet the standard.

3. The BiOp overestimates, or for some measures, does not estimate improvements to survival resulting from implementation of the Reasonable and Prudent Alternative (RPA).

(a) *Improvements in survival of juvenile salmon and steelhead.*—The BiOp evaluates jeopardy based on the assumption that estimated improvements in survival of juvenile salmon and steelhead are primarily the result of the measures implemented under the 1995 Biological Opinion, and included as part of the proposed action. These improvements could be a result of using data from recent high flow conditions or an artifact of using different models to describe the base conditions.

(b) *Improvements in survival of adult salmon and steelhead.*—The BiOp evaluates jeopardy based on the assumption that the RPA reduces losses of adult salmon and

steelhead caused by the Federal hydropower system by 25 percent. No data or analyses are presented to support this assumption.

(c) *Hydropower system responsibility.*—The BiOp does not adequately explain why certain assumptions were used, and not used, to determine the level of impact attributable to the Federal hydropower system. The BiOp relies on assumptions that require the least amount of hydropower system improvements by selecting "best case" scenarios.

(d) *Survival improvements from harvest, habitat and hatchery measures.*—The BiOp evaluates jeopardy based on the assumption that "the greatest opportunity for survival improvements may lie outside the scope of the hydropower corridor". This assumption is based on misleading "numeric experiments" rather than analyses of feasible management actions. No data or analysis is presented to support the conclusion that necessary survival improvements can be achieved from harvest, habitat and hatchery measures. Nor is there an assessment of risks of extinction and associated uncertainties under these measures.

(1) *Harvest rates.*—The BiOp appropriately concludes that for wild Snake River spring and summer chinook, further harvest restrictions will not produce significant survival improvements and sets the overall fishery impact standard at the spring season 2000 level of 6–9 percent, which is a similar impact rate to the level of 6–10 percent set by NMFS and captured in *United States* v. *Oregon Management Agreements*, 1996–99. It inappropriately indicates the majority (if not all) the spring and summer chinook impacts could be allocated to the Treaty Indian tribes because of Federal trust responsibility and the Federal view that tribal harvest has a priority legal standard over non-tribal harvest. The parties to *United States* v. *Oregon* negotiate Treaty Indian and non-Indian harvest sharing. A non-Indian impact level of 1–3 percent is considered the minimum to conduct non-Indian selective fisheries on abundant Willamette and Cowlitz hatchery-stock spring chinook.

(2) *Harvest measures benefits.*—The BiOp implies benefits from harvest restrictions on listed stocks other than Snake River spring and summer chinook, but fails to point out those restrictions must remain in place for decades, and that some require agreement with Canada.

(3) *Selective fisheries.*—The BiOp does not clearly explain that while much focus of selective fisheries will be toward hatchery origin fish, selective fishery opportunities are available for healthy wild stocks (e.g., Mid-Columbia sockeye and upriver bright fall chinook salmon).

(4) *Fishery effort reduction program.*—The BiOP does not clearly explain whether buyouts of commercial fishing licenses and permits are voluntary.

(5) *Hatcheries.*—The BiOp suggests changes to artificial production programs, but only qualitatively assesses how changes will affect listed salmon and steelhead. In addition, the assessment erroneously attributes potential survival improvements to monitoring and evaluation of artificial production programs.

(6) *Habitat.*—The BiOp does not describe specific measures for habitat protection and restoration in subbasins, nor does it include measures to increase mainstem spawning habitat for fall chinook in impounded reaches. It also does not explain how necessary survival improvements for Snake River spring and summer chinook will be achieved, given that it concludes that habitat measures offer little potential improvement and assigns Snake River subbasins a low priority.

(e) *Feasibility of timely implementation.*—The BiOp evaluates jeopardy based on the assumption that harvest, hatchery and habitat measures are timely implemented and produce near-term survival improvements. However, it neither evaluates the feasibility and risks of implementing any of these measures, nor offers a "game plan" to ensure timely implementation. Survival improvements from habitat measures likely would not be realized for decades.

4. The BiOp describes an RPA for operation of the Federal hydropower system that does not significantly change the status quo. The BiOp does not acknowledge that many measures in the 1995 Biological Opinion were not implemented as intended, or at all, for various anticipated and unanticipated reasons. As a result, the BiOp does not assess the likelihood that individual measures in the proposed RPA will be fully implemented.

(a) *Flow.*—The BiOp does not designate meeting flow needs of listed salmon and steelhead as at least an equal priority with other uses of the water (e.g., power generation). It does not aggressively seek, nor does it describe steps to acquire additional volumes of water necessary to meet flow targets.

(b) *Transportation.*—The BiOp does not acknowledge the considerable uncertainty in the potential benefits of transportation. As a result, it does not adequately spread the risk between transporting listed salmon and steelhead and leaving them to migrate in river by limiting the percentage of fish transported to no more than 50 percent.

(c) *Spill.*—The BiOp reduces spill at The Dalles Dam from 64 percent to 40 percent, despite the fact that no statistically significant results exist that indicate the need for the change.

5. The BiOp does not adequately explain whether the success of the RPA can be confidently described by proposed performance standards and measures after 5–8 years.

(a) *Population summary statistic.*—(λ)Although it is appropriate to use a life-cycle summary statistic such as λ as a performance measure, using λ alone may not incorporate variability. The BiOp does not clearly explain whether and how it incorporates variability in its measurement of performance. The BiOp also does not clearly explain whether the time series used to estimate λ is the 1980 to newest years or just the newest years.

(b) *Performance measures.*—The BiOp does not clearly explain whether it will use consistent methods to compare performance before and after implementation of the RPA.

(c) *Evaluation of uncertainty and error.*—The BiOp does not evaluate the feasibility of resolving uncertainty, or assess whether the analytical approach will be able to reject the null hypothesis that the RPA results in no survival improvement over current measures. It does not describe feasible experimental design options to manage uncertainty and error.

(d) *Experimental management.*—The BiOp does not clearly state whether it embraces approaches that evaluate the value of what we can learn from efforts to ensure the survival and recovery of listed salmon and steelhead.

6. The BiOp does not anticipate and have ready an alternative RPA, if the proposed RPA does not produce survival improvements necessary to ensure the survival and recovery of listed salmon and steelhead. The midpoint evaluation is not aggressive enough to avoid jeopardy given the unstated and likely great uncertainty of the RPA and the high probability of extinction.

(a) The BiOp does not adequately assess the likelihood of recovery under an alternative RPA (e.g. dam-breaching) after 5 to 8 years, if the proposed RPA does not significantly improve survival (λ>0.95). If survival does not improve or continues to decline over the time period, extinction of certain populations may be unavoidable under any action.

(b) The BiOp does not assess the lead time needed to implement an alternative RPA, nor does it describe what needs to be done in the interim to ensure timely implementation. It does not describe steps that must be taken now to satisfy NEPA requirements, get congressional authorization, complete mitigation planning etc, and have an alternative RPA ready to go, if needed. These steps could take 5–8 years after their initiation to complete.

(c) The BiOp cites significant uncertainty in survival improvements from dam breaching as a basis for deferring its consideration until some point in the future. However, the biological decision analysis completed as part of the Plan for Analyzing and Testing Hypotheses (PATH) project concluded that the benefits from dam breaching were more certain than non-breaching alternatives. The BiOp does not describe decision criteria it would use or the approach it would take to resolve conflicting assumptions, especially with respect to delayed mortality, and reduce uncertainties associated with the proposed RPA or an alternative RPA.

(d) The BiOp cites the fact that only Ecologically Significant Units (ESUs) in the Snake River benefit from dam breaching as a basis for deferring its consideration until some point in the future. However, a number of measures in the proposed RPA only affect certain ESUs. The BiOp does not describe why this criterion is valid for one potential measure and not others. Problems with Snake River ESUs are not less significant because other salmon populations have subsequently been listed as threatened or endangered.

CONCLUSION

The perilous state of these ESA listed stocks is real; last year in two of the Snake River spring/summer chinook indicator stocks that spawn in pristine wilderness areas, zero fish returned. We may have already lost Snake River sockeye, and coho have gone extinct in the Snake River basin since efforts have been made to mitigate for the FCRPS. In the opinion of the ODFW, based on our assessment of the current data and analyses, the draft Biological Opinion does not use the best available scientific information to determine the management actions most likely to recover Snake River ESA listed stocks.

The problems highlighted above underestimate the true risks to these stocks and thus, underestimate the survival improvement needed to avoid jeopardy. We also believe that the analyses used in the draft Biological Opinion do not identify factors

most likely responsible for the decline in salmon and steelhead and, therefore, prescribe management actions that may not provide the greatest survival improvement to listed stocks. Specifically, the draft Biological Opinion shifts responsibility of hydrosystem mitigation away from the mainstem and onto habitat restoration, hatcheries, and harvest reductions. The benefits expected to occur from the RPA's offsite mitigation and the aggressive hydrosystem operations are subjective and unsupported. We believe these benefits are overestimated, particularly for the Snake River spring/summer chinook where harvest is already extremely low, are located in good to pristine habitat and thus been assigned the lowest priority for habitat improvements, and have no hatcheries in 6 of the 7 indicator stocks. The aggressive hydrosystem improvements under the RPA provide only a slight increase of the flow targets defined in the 1995 Biological Opinion, which often have not been met in the last 5 years. In fact, the draft Biological Opinion actually decreases flow targets for Columbia River chum. In addition, we do not believe that the described methods to assess the success of the RPA can convincingly determine if the RPA has achieved its goals, over the 5–8 year interim period. Finally, we do not believe the draft Biological Opinion adequately anticipates and has prepared an alternative RPA that can be immediately implemented if at the end of this interim period the current RPA has failed.

STATEMENT OF EDWARD C. BOWLES, ANADROMOUS FISH MANAGER, STATE OF IDAHO, DEPARTMENT OF FISH AND GAME

INTRODUCTION

Mr. Chairman and members of the subcommittee, thank you for the opportunity to testify on the National Marine Fisheries Service (NMFS) Draft Biological Opinion (2000 BiOp) for operation of the Federal Columbia River Power System (FCRPS) and the Federal Caucus Draft Basinwide Salmon Recovery Strategy (Recovery Strategy). These documents will shape the region's focus for recovery efforts and thus profoundly effect the very existence and future of wild salmon and steelhead in the Snake River Basin.

Your leadership on this issue, Mr. Chairman, is both refreshing and vital. I had the pleasure of testifying a couple times to your subcommittee in the House of Representatives, and found your approach thoughtful, open-minded and solution oriented. Your knowledge and first hand experience with the fish are unprecedented in Congress and reflect highly on your commitment to solve this decades-old tragedy. I think you would agree that there is something about personally watching wild salmon spawn or wrestling with a hatchery salmon on the end of your fishing line that helps make salmon recovery real and tangible.

The intent of this testimony is not to advocate specific management actions, but to help ensure the best possible science provides the analytical basis of the draft 2000 BiOp and Recovery Strategy. The selection of recovery actions is a policy decision made in the context of biological and non-biological considerations. The role of the Idaho Department of Fish and Game (IDFG) is to help strengthen the scientific foundation from which various management alternatives are considered, and assess these alternatives from a biological and scientific basis. A strong scientific foundation for conservation decisions is a goal common to both the State of Idaho and the Federal Caucus.

My professional judgment is that the draft 2000 BiOp and Recovery Strategy are doomed for failure on several fronts. For ecological, political and economic reasons, it is imperative that the 2000 BiOp and Recovery Strategy are set up for success, not failure. If the desire is to address all significant sources of "discretionary [1]" mortality (short of using breach and additional Idaho water) to see if fish recovery can be secured without breach, then the 2000 BiOp and Recovery Strategy should focus on: (1) the primary sources of discretionary mortality, and (2) implement aggressive actions to address this mortality. I am concerned that the draft 2000 BiOp and Recovery Strategy fail on both counts; the hydrosystem is no longer the focus and the proposed actions lack substance. This will waste significant time and resources on actions that cannot provide recovery because the actions do not address the primary sources of discretionary mortality. I believe this failure will eventually result in

[1] Discretionary mortality is the mortality beyond the natural baseline that can potentially be managed. Most discretionary mortality is anthropogenic, although some factors, such as avian and pinniped predation, are also partially linked to natural ecosystem processes.

more draconian actions than may be necessary for success. This is a recipe for failure, with significant ecological, social and economic consequences.

NMFS' estimates of expected improvement provided by Reasonable and Prudent Actions (RPA) identified in the draft 2000 BiOp accentuate my concern that the 2000 BiOp is set up for failure. The draft 2000 BiOp concludes current FCRPS operations constitute jeopardy, and then identifies a RPA to avoid jeopardy. Surprisingly, the RPA measures associated with juvenile spring/summer chinook migration through the hydrosystem are only expected to improve survival by 1–2 percent over current operations (2000 BiOp, pages 6–76 and 9–161, Tables 6.3–2 and 9.7–6). NMFS then speculates on hoped for benefits in adult migration, habitat and hatcheries to make up the difference to get to no jeopardy. It is disappointing and perplexing that NMFS concentrates so little effort to improve survival associated with juvenile migration, when all other salmon managers [2] in the Basin, and regional societies of professional fisheries scientists [3], are in agreement that this is the primary factor limiting the survival and recovery of listed Snake River salmon and steelhead. It is also disappointing and perplexing that NMFS stakes such high hopes on improvements in adult migration, habitat and hatcheries, when available data indicates these benefits are unlikely to be biologically feasible. NMFS has not assessed feasibility, and all other salmon managers in the Basin are in agreement that these areas of discretionary mortality are less significant than hydrosystem impacts on juveniles, and cannot add up to recovery.

If the decision to breach lower Snake River dams is deferred, I believe the Four Governors' Plan [4] does a better job of keeping the primary sources of discretionary mortality in focus and embracing a conceptual approach to attempt to address these problems prior to breaching dams. Although there is no scientific basis for concluding Snake River salmon and steelhead are likely to recover with non-breach alternatives, interim actions focused on the primary sources of discretionary mortality can certainly benefit the fish. Available scientific analyses indicate these actions will help moderate extinction risk, will increase the frequency of rebuilding opportunities, and will increase the frequency of harvestable hatchery surpluses compared to current operations, even though they are unlikely to provide the magnitude of survival benefits required to secure recovery.

In general, the structure of the draft 2000 BiOp and Recovery Strategy is adequate to frame the scientific information. The problem is that the underlying scientific information used in the documents has several fundamental errors and omissions. These errors and omissions alter the conclusions, accentuate uncertainty beyond the limits of scientific objectivity, and result in a misleading depiction of the fundamental choices that face the region if salmon recovery is to succeed. The technical information currently available is adequate to produce a biologically sound and scientifically defensible 2000 BiOp and Recovery Strategy. If the errors and omissions are corrected, we believe the documents can accurately represent the biological component of recovery options, which policymakers can consider along with important social and economic information in determining recovery actions.

The remainder of my comments will identify the procedural and technical aspects of the draft 2000 BiOp and Recovery Strategy that heighten the risk of failure and identify changes necessary to promote success.

COLLABORATION

The draft 2000 BiOp and Recovery Strategy are Federal products developed without true collaboration with State and tribal fisheries scientists. Many of the State and tribal technical concerns could have been addressed during development of these documents if NMFS would have allowed collaboration on its Cumulative Risk Initiative (CRI) [5]. The CRI analyses provide much of the scientific basis for the draft 2000 BiOp and Recovery Strategy. The CRI analyses are also the primary source of the scientific errors and omissions in these Federal documents, which result in

---

[2] The Salmon Managers are the state, tribal and Federal entities with statutory authority and responsibility for managing salmon and steelhead in the Columbia River Basin. These include Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, Washington Department of fish and Wildlife; Shoshone-Bannock, Nez Perce, Yakama, Warm Springs, and Umatilla tribes, United States Fish and Wildlife Service and National Marine Fisheries Service.

[3] Resolutions by the Idaho and Oregon chapters of the American Fisheries Society and the Western Division of the American Fisheries Society all identify the FCRPS as the primary factor limiting recovery of listed Snake River salmon and steelhead.

[4] Recommendations of the Governors of Idaho, Montana, Oregon and Washington for the Protection and Restoration of Fish in the Columbia River Basin, July 2000.

[5] The CRI is an analytical process established by NMFS in 1999 and comprised on NMFS scientists. The primary purpose of CRI is to analyze extinction risks and conservation opportunities for listed salmon and steelhead in the Columbia River Basin.

misleading conclusions. Although the ramifications of these errors and omissions are significant, they can be easily corrected for the final Federal documents if scientific collaboration is allowed.

Collaboration means working jointly on scientific issues to develop methodologies and analyses that embrace the full expertise of appropriate State, tribal, Federal and independent scientists. True collaboration promotes defensible science through peer review, promotes broader acceptance and ownership of methodologies and results through active participation, and reduces the risk of institutional bias. Collaboration does not undermine the statutory authorities and responsibilities each participant brings to the process. Science developed collaboratively can provide a common foundation from which differing authorities and responsibilities can proceed accordingly.

Recovery decisions facing the region are important and controversial. Sound science must lay the foundation for these decisions. Broad ownership of this science through collaboration is a vital step in developing recovery actions that will withstand judicial challenge and garner regional support. NMFS embraced true collaboration in PATH[6], and has set up collaborative teams to develop recovery standards and plans for other listed salmon and steelhead ESUs in the Basin. It is disappointing and perplexing that NMFS chose to take a unilateral, non-collaborative approach in the Snake River Basin after PATH was discontinued. Inadequate time for collaboration is not a worthy excuse. PATH was a 5-year collaborative effort. Time was short only after PATH was abandoned.

Regrettably, NMFS' track record for embracing collaboration with their State and tribal peers is dismal for Snake River science issues once PATH was discontinued. The current process is coordination, not collaboration. NMFS develops their methodologies and conducts their analyses unilaterally, then posts their information on a web page for comment, or holds a "workshop" to discuss their information. The States and tribes have spent considerable time and resources trying to insert their concerns and analyses into this process, but have little to show for their efforts[7]. When corrections have been made, it often seems adjustments are made in other standards or analyses to compensate so general conclusions remain the same. For example, NMFS made some necessary corrections to the rate of population growth that accelerated projected declines, but then NMFS arbitrarily lowered the survival standard, resulting in little change to extinction risk and the amount of improvement needed to avoid jeopardy. We have been encouraged by attempts of some NMFS scientists to establish more collaboration with our scientists, but opportunities remain sparse. Without collaboration on the draft 2000 BiOp or Recovery Strategy, the States and tribes are forced to try to correct errors and omissions through the formal and brief comment period. To add to this difficulty, new analyses by NMFS relating to the 2000 BiOp have come out in the middle of this comment period (Toole 2000).

Scientific collaboration with State and tribal fisheries scientists was a key element of Judge Marsh's decision in *IDFG* v. *NMFS*[8], and a key provision in the 1995 and 1998 biological opinions for FCRPS operations (NMFS 1995; NMFS 1998). To NMFS' credit, PATH was created to meet these mandates and represents a truly collaborative scientific approach to sorting out the science associated with the long-term recovery decision for Snake River salmon and steelhead specified in the 1995 and 1998 FCRPS BiOps. NMFS and other Federal Caucus members were key participants in PATH.

As PATH conclusions began to clarify the science, NMFS suddenly and unilaterally began an alternative scientific process called CRI. Although the CRI analyses are non-collaborative, preliminary, and not fully analyzed or peer reviewed, CRI results became equal, if not greater, partners with PATH in defining the science in the Anadromous Fish Appendix of the Corps' Draft Environmental Impact Statement and the Federal Caucus' All-H Paper. This pattern continues in the latest draft 2000 BiOp and Recovery Strategy, which marginalize PATH results even further.

Although the PATH and CRI analyses reach similar conclusions on several key points, there are also several key differences. These differences accentuate the need

---

[6] The Plan For Analyzing the Testing Hypotheses (PATH) is a collaborative analytical process established by NMFS in 1995 and comprised of State, tribal, Federal, and non-governmental scientists. The purpose of PATH is to help sort out conflicting scientific hypotheses regarding Snake River salmon and steelhead recovery issues, particularly in the context of management alternatives associated with the FCRPS.

[7] For example, Attachments A and B of IDFG comments on NMFS' A-Fish Appendix describe some concerns and NMFS' response (IDFG 2000b).

[8] *Idaho Department of Fish and Game* v. *National Marine Fisheries Service*, 850 F. Supp. 886 (D. Or. 1994).

for continuing a truly collaborative process to help identify and frame the differences and help promote a convergence of the science where possible. Accentuating the differences, without an honest attempt to resolve the differences through scientific collaboration, is a disservice to the decision process established in the 1995 and 1998 FCRPS BiOps.

I do not want to leave the impression that CRI is not constructive toward resolving conservation and recovery issues. The intent and general framework of CRI is to estimate extinction risks and identify and allocate opportunities for conservation. This is necessary for recovery discussions and decisions. Some of the CRI focus is in areas PATH did not focus, and thus brings new information for consideration. Other areas overlap, and provide an opportunity to corroborate results from the different scientific approaches. But for this effort to be constructive, the CRI analyses must be based on the best available information and incorporate State, tribal and independent expertise in helping resolve scientific disputes and uncertainties. We are confident that if NMFS and the Federal Caucus embrace this approach, PATH and CRI can be complementary rather than adversarial. If NMFS maintains an autonomous approach to CRI, the opportunity to clarify the science for recovery decisions will be lost and regional "ownership" diminished.

It is important that recovery decisions are not delayed unnecessarily while the science is sorted out once again. We believe most of our concerns regarding possible errors and omissions in the CRI analyses can be addressed quite easily and quickly through collaboration. We are committed to working collectively with NMFS scientists to move this process forward.

SCIENTIFIC OBJECTIVITY

In *IDFG* v. *NMFS*, Judge Marsh was critical of "arbitrary and capricious" decisionmaking by NMFS in the 1993 FCRPS BiOp. Given this litigation history, it is perplexing why NMFS tended to select the most optimistic (i.e., least conservative) assumptions regarding extinction risk, lack of hydrosystem impacts, and the benefits of improving habitat and hatcheries in the draft 2000 BiOp and Recovery Strategy. At best, this approach appears inconsistent with the ESA requirement to be risk-averse in the face of scientific uncertainty when protecting listed species. At worst, this approach is poor stewardship when non-conservative assumptions are accentuated and conservative assumptions ignored, in spite of scientific evidence to the contrary.

For example, NMFS usually selected non-conservative assumptions for factors affecting the amount of survival improvements needed to avoid jeopardy. NMFS selected the optimistic assumption that small, threatened populations face no threat of an extinction vortex, in spite of theoretical and empirical evidence to the contrary (Dennis 1991; BRWG 1994; Botsford 1997). NMFS also selected optimistic assumptions for their extinction and survival standard, recovery standard, FCRPS hydrosystem performance standard, definition of high risk, hatchery effectiveness, years for time series, and effect of fish density on population growth rates (Table 1).

NMFS also typically selected optimistic assumptions for factors affecting the amount of survival improvements attributed to existing and proposed measures in the 2000 BiOp. For example, NMFS selected the most optimistic assumptions to attribute hydrosystem improvements for any survival improvements of juvenile migrants since the 1995 BiOp, rather than balance this assumption with the possibility that model differences or high natural flow and spill from good water years could also account for these increases. In contrast, NMFS selected pessimistic assumptions regarding the effectiveness of breach on fish survival. NMFS assumed there is no delayed mortality associated with juveniles migrating inriver through the FCRPS, in spite of a wealth of information to the contrary (Marmorek et al. 1996; IDFG 1998, 1999, 2000a, 2000b; Marmorek and Peters 1998; SRP 1998; Bouwes et al. 1999; Congleton et al. 1999; Schaller et al. 1999; NMFS 2000a) and no NMFS data or analyses confirming their assumption.

The effect of NMFS accentuating non-conservative assumptions, regardless of scientific information questioning these assumptions, results in several fundamental errors in the Draft 2000 BiOp and Recovery Strategy: (1) underestimation of the actual extinction risk and overestimation of the probability of survival and recovery; (2) underestimation of the survival improvements necessary to avoid jeopardy and ensure survival and recovery of listed Snake River salmon and steelhead; and (3) overestimation of the ability of 2000 BiOp measures to provide necessary survival improvements.

The collaborative decision analysis approach adopted by PATH incorporated the full spectrum of assumptions, uncertainties and weight of evidence in order to more

objectively characterize risks and conservation opportunities (Marmorek and Peter 1998; Marmorek et al. 1998; Peters et al. 1999).

The 2000 BiOp and Recovery Strategy should present a more objective characterization of PATH results and uncertainty as a decision-analysis tool, across the full range of scientific debate and uncertainty, without bias toward assumptions promoted by NMFS scientists. There is much evidence in PATH, the draft Anadromous Fish Appendix and the ESA record as a whole that the hydrosystem is a source of both direct and delayed mortality of transported and in-river juvenile migrants. NMFS presents an unbalanced view of sources of extra mortality, emphasizing uncertainty for one of the listed populations (spring/summer chinook). All Snake River anadromous salmonids are threatened or endangered or extinct (coho), and have hydropower impacts in common. Alternative, non-hydro explanations of extra mortality posited by NMFS in the Federal documents should explain recruitment patterns for the entire suite of Snake River anadromous salmonids, but they do not.

IDFG disagrees with NMFS decision to disregard the PATH Weight of Evidence process and the Scientific Review Panel weighted analysis. Full disclosure of the weight of scientific evidence for key alternative hypotheses, across species lines, should be presented in the final 2000 BiOp and Recovery Strategy.

OBJECTIVE RISK ASSESSMENT

Risk assessment is critical to ESA decisionmaking processes. There will always be ecological and scientific uncertainty. The key to objective risk assessment is determining how to best meet the biological needs of the fish in the face of these uncertainties. There should be a clear recognition that lack of a decision, or delay, is actually a conscious decision that the uncertainties are too great to act on, and that the listed populations can survive the delay and still retain enough inherent productivity and diversity to remain poised for recovery. To moderate the risk, this approach should be coupled with aggressive actions in all possible areas that can be agreed on, recognizing the greatest uncertainty may actually be whether there will be any fish left to save once all the questions are answered.

In my professional opinion, the amount of time available for decisionmakers to continue trying to sort out recovery options is largely dependent on the weather and the ocean. Available data indicate Snake River spring/summer chinook salmon can maintain current population levels, or even rebuild somewhat, when there are above average runoff conditions (e.g., high natural flow and uncontrolled spill) coupled with average or better ocean conditions (e.g., cool temperature and strong coastal upwelling) (Figures 1, 2 and 3). The same data indicate Snake River salmon can decline precipitously when runoff or ocean conditions are poor. The overall trend for salmon across the range of environmental conditions is downward. These environmental factors appear to influence adult returns and survival rates far more than any suite of management actions taken in recent years.

Improved adult returns this year and projected for next year are largely the result of good runoff and ocean conditions. As long as these environmental conditions remain above average, Snake River salmon populations will likely persist or even rebuild slightly; allowing society some additional time to debate and experiment with management options. Conversely, if these environmental conditions do not remain above average (or potentially good runoff conditions are dampened by FCRPS operations [9]), then Snake River salmon populations will likely decline; making any additional delay risky for conservation and recovery of these fish. Dr. Petrosky, the lead fisheries scientist from IDFG on this issue, characterized NMFS' approach to salmon recovery thus: "If we can always average above average, things should average out OK." Regrettably, that is not the way nature works, therefore this is not a risk-averse approach to species conservation.

If additional aggressive actions to address the mainstem FCRPS are delayed, I recommend linking this decision to prevailing environmental conditions, particularly snowpack, runoff, mainstem water temperature and ocean temperature and upwelling. If these conditions deteriorate from what was observed for juveniles migrating during 1997–1999, then the FCRPS configuration decision should be revisited immediately and additional emergency actions taken in other sectors until FCRPS reconfiguration is authorized and implemented. These emergency actions should focus on actions with immediate and direct benefits to the fish, such as removing avian piscivores from the estuary, reducing pinniped predation, altering

[9] In 1999 and 2000, above average and average snowpack should have provided good spring runoff conditions, but inflexible FCRPS flood control operations coupled with cool or hot spring weather resulted in reduced flow and spill at critical times during the spring migration period (see TMT minutes).

flood control operations to help maintain high springtime flows, increased mainstem spill, and additional harvest constraints.

It will be both regrettable and scientifically unprofessional if recent and future changes in fish survival and abundance are credited to management actions without first factoring out the influence of natural runoff and ocean conditions. For example, if new management actions are implemented which are actually beneficial, but environmental conditions deteriorate relative to the baseline, then it may appear these factors are not beneficial when in fact they may have eased the impact of these deteriorated environmental conditions. Conversely, if management actions are credited for an upswing in survival and abundance, which are actually the result of improved environmental conditions, then a false sense of security can result in further delay and elevated risk when environmental conditions deteriorate.

The history of debate on Snake River salmon recovery actually demonstrates this risk. Snake River salmon and steelhead declined precipitously in the late 1970's and ESA listing was avoided in 1980 when the Northwest Power Planning Act ushered in a new period of management planning and action. Good outmigration conditions in 1982–84 from high natural flow and spill at mainstem dams apparently resulted in an upturn in salmon survival and adult returns in the mid 1980's (Figure 1). At the time, this upturn was often equated with management actions (e.g., Raymond 1988). Environmental conditions shifted in the late 1980's and early 1990's, demonstrating that Snake River salmon and steelhead had not actually turned the corner toward recovery from the management actions. We are at risk of repeating this error again. Environmental conditions were once again above average during the late 1990's, resulting in an upturn in fish survival and abundance at the turn of the century. The draft 2000 BiOp credits much of this upturn to actions implemented with the 1995 and 1998 BiOps (Draft 2000 BiOp, pages 6–75 and 6–76, Tables 6.3–1 and 6.3–2). Fish survival during the next 5, 8 and 10 years will be used to determine if the 2000 BiOp is successful, or if the breach alternative needs to be implemented to meet minimum needs of the fish. It is vital that the relative influence of environmental factors, such as above or below average natural runoff and ocean conditions, are factored out in the decision process. If decisions whether or not to breach are simply made based on annual population growth rates over a set number of years, then decisionmakers are basically playing breach roulette with the weather.

Another important aspect of risk assessment is determining the biological consequences of being wrong. This assessment requires determining which actions are likely to have the most positive biological response even if decisions are made based on false assumptions. This assessment helps determine the most risk-averse alternatives.

IDFG believes objective risk assessment in the final 2000 BiOp and Recovery Strategy will demonstrate:

- Snake River ESUs are imperiled, particularly at the population level; providing recovery requires a substantial improvement (e.g., three-fold) in overall life cycle survival;
- the most risk-averse actions, for all species and runs (recognizing the full range of scientific debate and uncertainty) must address direct and delayed effects of the FCRPS, coupled with immediate actions regarding harvest, predation, early ocean and estuary survival and degraded tributary habitat; and
- resolution of uncertainty adequate to change these conclusions is unlikely to be gained through an additional 5 or 10 years of research.

The importance of the 2000 BiOp and Recovery Strategy to long-term recovery decisions accentuates the need for objective risk assessment. This is why a more collaborative approach should be embraced prior to completion of the 2000 BiOp, Recovery Strategy and Corps Lower Snake River Feasibility Study/EIS.

SCIENTIFIC APPROACH FOR ASSESSING JEOPARDY AND CONSERVATION ACTIONS

There are several important scientific steps that must be taken to determine biologically defensible recovery strategies:

(1) determine extinction risk and survival and recovery standards for jeopardy,

(2) determine the amount of survival improvements needed to avoid extinction and meet survival and recovery standards,

(3) determine fish mortality and allocate among life stages,

(4) determine the amount of discretionary mortality above the natural baseline,

(5) assess management opportunities to address this discretionary mortality,

(6) select a suite of management actions that are likely to provide the necessary survival improvements, and

(7) develop an aggressive monitoring and evaluation plan to assess effectiveness within the context of environmental variability.

None of these steps can be avoided.

As mentioned earlier, the general structure of the draft 2000 BiOp and Recovery Strategy is adequate to frame the necessary scientific information. The problem is that the scientific information used in these steps has several fundamental errors and omissions, and some steps, such as determination of discretionary mortality and ability of management actions to address this mortality (i.e., biological feasibility), were not included in the NMFS analysis.

IDFG is currently preparing formal comments on the draft 2000 BiOp and Recovery Strategy, which will hopefully be submitted as part of the official State of Idaho comments. These comments are due September 25, 2000. IDFG has commented extensively in the past on the Federal scientific analyses used in the draft 2000 BiOp and Recovery Strategy (IDFG 1999, 2000a, 2000b). We only provide a brief synopsis of these concerns in this document and request the subcommittee refer to our prior documents, as well as the comments we will be completing this month, for more detailed discussion.

Step 1: Determine extinction risk and survival and recovery standards for jeopardy.

NMFS used optimistic assumptions to evaluate extinction risk and lowered the standards used for jeopardy relative to the 1995 and 1998 FCRPS BiOps. The effect of these errors is underestimation of actual extinction risk and reduction in the amount of survival improvements necessary to avoid jeopardy. To correct these errors, NMFS must include a more objective range of assumptions regarding extinction threshold, depensation, definition of high risk, hatchery effectiveness and density dependence.

NMFS should also adhere to the survival and recovery standards developed collaboratively as a result of *IDFG* v. *NMFS* (BRWG 1994; Marmorek et al. 1998) and the jeopardy standards established in the 1995 and 1998 FCRPS BiOps (NMFS 1995, 1998). NMFS apparently has shifted from a focus on recovery, to simply trying to avoid absolute extinction. The 2000 BiOp should develop a clear "crosswalk" linking the earlier jeopardy standard developed collaboratively to the standard currently proposed by NMFS. IDFG believed the standard developed for the 1995 BiOp was not conservative enough to protect Idaho's wild salmon populations, and objects to any attempts to "lower the bar" even farther.

For example, NMFS defined a "moderate to high probability of recovery" as only a 50:50 chance that the standard would be achieved within 48 years (NMFS 1995; 2000b). The *IDFG* v. *NMFS* collaborative process recommended 24 and 48 year recovery standards (BRWG 1994), but NMFS selected a standard for only the 48-year period (NMFS 1995). NMFS now states: "It may be unrealistic to expect populations to return to recovery abundance levels within this time period [48 years]," and therefore introduced a 100 year standard (draft 2000 BiOp, page 1–12).

Step 2: Determine the amount of survival improvements needed to avoid extinction and meet survival and recovery standards.

The problems identified in Step 1 carry over into Step 2. NMFS' use of optimistic assumptions regarding extinction risk, lowering of the jeopardy standard, and assumption that populations can grow exponentially result in the perception of less difference between the current productivity of the fish and the productivity necessary to avoid extinction and provide recovery. This narrowing of the gap by NMFS is not scientifically supportable.

Thus the draft 2000 BiOp concludes that approximately a 30 percent improvement in lifecycle survival of Snake River spring/summer chinook is necessary to meet the 24-year jeopardy standard. Because the CRI approach includes such optimistic assumptions (Table 1), it is not surprising that this estimate is far lower than estimates for recovery that include less optimistic assumptions (IDFG 2000a, 2000b; Peters and Marmorek 2000). These assessments indicate a 170 percent or more improvement in lifecycle survival is needed for recovery of Snake River spring/summer chinook.

Step 3: Determine fish mortality and allocate among life stages.

The CRI analysis used in the draft 2000 BiOp and Recovery Strategy does address one concern expressed by other Salmon Managers regarding allocation of overall lifecycle mortality of Snake River spring/summer chinook salmon (IDFG 2000a, 2000b; STUFA 2000). CRI now uses empirically derived estimates of smolt-to-adult survival to solve for egg-to-smolt survival, similar to the approach recommended by the Salmon Managers. Mortality allocation issues related to delayed hydrosystem mortality (smolt-to-adult) were not resolved in the CRI analysis.

Step 4: Determine the amount of discretionary mortality above the natural baseline.

NMFS failed to determine the amount of discretionary mortality for each life stage above the natural baseline. This step is crucial to developing recovery strategies because it allows decisionmakers to focus actions on the primary limiting factors that can be managed. The majority of mortality in the lifecycle of salmon and steelhead is natural mortality that has little chance of being improved by man. Effective recovery strategies will focus on the discretionary mortality beyond this natural baseline, which is usually the result of anthropogenic factors.

Available data indicate relatively little discretionary mortality of Snake River salmon and steelhead during the egg-to-smolt stage, and relatively large discretionary mortality during the smolt-to-adult stage. Potential survival improvements from addressing the discretionary mortality in the egg-to-smolt stage (i.e., spawning and rearing habitat) range from 0–34 percent for seven indicator populations (median 6 percent) (Marmorek et al. 1998; IDFG 2000a). Estimated potential survival improvements from addressing discretionary mortality during the smolt-to-adult stage is over 200 percent, based on survival trends of comparable upriver and downriver stocks (Figures 3 and 4) (Marmorek and Peters 1998; IDFG 2000a, 2000b; STUFA 2000).

The draft 2000 BiOp and Recovery Strategy imply much of this mortality in the smolt-to-adult life stage is not discretionary because smolt transportation has largely fixed the dams and NMFS assumes no delayed mortality of fish migrating inriver. NMFS assumes the extra mortality must be associated with non-discretionary ocean conditions, discretionary estuary conditions (e.g., estuary habitat and predators), and delayed effects of discretionary conditions during the egg-to-smolt stage (e.g., hatcheries and spawning and rearing habitat). Although the potential sources of discretionary mortality in the estuary (e.g., avian and pinniped predators) should be addressed, NMFS' assessment is not based on the weight of scientific evidence.

NMFS concurs that the level of delayed or "extra" mortality associated with the fishes' hydrosystem experience is pivotal to survival and recovery decisions for the Snake River ESUs (NMFS 1995, 1998, 1999, 2000b). Given the importance of this issue, NMFS should have devoted much of the draft 2000 BiOp and Recovery Strategy to an objective and thorough assessment of the weight of scientific evidence supporting or not supporting this source of mortality. Regrettably, NMFS failed to take this approach and instead accentuated uncertainty and recommended more study.

The final 2000 BiOp and Recovery Strategy should include full disclosure of compelling scientific evidence for substantial delayed effects of the hydrosystem experience. This evidence includes:

- continued downward trend of adult returns and survival for all species and runs of wild Snake River salmon and steelhead since completion of the FCRPS;
- an average 65 percent additional mortality (and thus potential 200 percent survival improvement) for upriver spring/summer chinook stocks relative to their downriver counterparts since completion of the FCRPS, and synchronous common-year effect of mortality factors experienced by both upriver and downriver stocks (e.g., additional lower Columbia River dams, estuary and early ocean conditions, disease (except as related to smolt transportation), harvest, hatcheries (except as related to smolt transportation), lower river and estuary predators, and climate);
- less disparity between survival of comparable upriver and downriver indicator stocks when outmigration conditions are more favorable (e.g., high natural runoff and spill);
- elevated post-Bonneville mortality of transported fish relative to uncollected inriver juvenile migrants;
- elevated post-Bonneville mortality of transported fish relative to inriver migrants based on current collection and transportation operations ('D'-value less than 0.74);
- transport and control ratios (T:C) that do not demonstrate a transport benefit relative to "true" inriver migrants passing dams via the spillway or turbines;
- contrasting reservoir-reach and smolt-to-adult survival patterns based on a number of collections (i.e., PIT tag detections) at dams;
- different survival of fish relative to transport location; and,
- the preponderance of scientific evidence demonstrating adverse direct and indirect consequences of exposing plant and animal species to anthropogenic factors completely outside of their evolutionary history.

The above points are discussed in more detail in prior IDFG comments (IDFG 2000a, 2000b).

The final 2000 BiOp and Recovery Strategy should also explicitly incorporate previous assessments of the weight of scientific evidence associated with various models and assumptions relating to FCRPS and non-FCRPS sources of mortality (IDFG 1998, 1999, 2000; Marmorek and Peters 1998; SRP 1998). NMFS' disregard for the

PATH weight of evidence analyses (Marmorek and Peters 1998; SRP 1998) is particularly discouraging.

The draft 2000 BiOp and Recovery Strategy also fail to provide a thorough and objective assessment of the weight of scientific evidence indicating other factors, not related to the hydrosystem, are primarily responsible for masking benefits of smolt transportation and other FCRPS measures, particularly within the context of the evidence described above. This line of reasoning and weight of evidence must be able to rationally address the full biological picture observed in the region.

The draft 2000 BiOp and Recovery Strategy should clearly describe the assumptions that must be true in order to conclude that current operations (e.g., smolt transportation, flow augmentation, spill, etc.) have successfully compensated for the adverse effects of the FCRPS. NMFS should then describe the weight of scientific evidence and theory for and against these assumptions.

For smolt transportation to provide survival benefits to offset the FCRPS related direct and delayed mortality, the following assumptions must be true: (1) "extra" mortality apparent for upriver stocks (for all species and runs) originated about the same time the FCRPS was completed, but is not related to the dams; (2) this extra mortality occurs in the estuary and ocean but is selective for Snake River fish (while excluding downriver stocks) and is not related to delayed effects of the dams or smolt collection and transport; (3) upriver stocks (including Snake River) go to "worse" spots in the ocean than downriver stocks (particularly after poor outmigration conditions evidenced by low mainstem flow and spill), but this behavior began only after completion of the FSRPS and is unrelated to the hydrosystem experience; (4) upriver stocks do not go to "worse" spots in the ocean when outmigration conditions are associated with high natural runoff and spill; (5) if ocean conditions are not the cause of "extra" mortality, then elevated disease and/or poorer genetics and less productive freshwater habitat accounts for this mortality, but it is not expressed until fish arrive at the estuary or ocean, is not related to the hydrosystem experience, and is apparent only in upriver stocks; and (6) extra or delayed mortality of Snake River stocks is not substantially higher for fish transported than those that migrated in-river and the delayed mortality of both groups is unrelated to the hydrosystem experience.

The weight of scientific evidence supporting this narrow set of assumptions is low (IDFG 1998, 1999, 2000; Marmorek and Peters 1998; SRP 1998). If NMFS chooses to accentuate this narrow set of assumptions, it must explain in detail why other assumptions were treated with less weight. NMFS must also convey the consequences of falsely accepting this narrow set of assumptions in alternative management options.

It is important to reiterate that the non-hydrosystem "masking" hypothesis requires two things to be true: high 'D'-value (i.e., very little difference in post-Bonneville mortality between inriver and transported fish) and little to no delayed mortality of inriver and transported smolts associated with their hydrosystem experience (e.g., cumulative stress and strain of collection, sorting, holding, loading, barging and releasing transported smolts; and cumulative stress and strain of delay, bioenergetic demand, disorientation, pressure changes, dissolved gas, etc. of passing through eight dams and reservoirs for in-river migrants). The draft 2000 BiOp and Recovery Strategy do not discuss the likelihood of both these points being true, within the context of the evidence described above.

The draft 2000 BiOp and Recovery Strategy should also clearly describe the management implications if 'D' is not high or "extra" mortality is hydrosystem related, and the management implications if 'D' and "extra" mortality are moderate. These assessments are critical to an objective risk analysis.

Step 5: Assess management opportunities to address this discretionary mortality.

If the 2000 BiOp and Recovery Strategy correct the errors and omissions outlined in steps 1 through 4, the documents will focus management actions on addressing the direct and delayed effects of the mainstem FCRPS, complemented with appropriate actions addressing freshwater and estuary habitat, predators, harvest and hatcheries.

It is apparent in the draft 2000 BiOp and Recovery Strategy that NMFS is trying to shift the focus off the hydrosystem as a major source of mortality (i.e., it has been fixed) and putting the focus on tributary and estuary habitat. This approach is not scientifically defensible and is unlikely to secure the survival and recovery of Snake River salmon and steelhead. In an attempt to rationalize this approach, the 2000 BiOp and Recovery Strategy overestimates, or in some measures does not estimate, survival improvements expected from the Reasonable and Prudent Alternative (RPA).

• NMFS makes the optimistic assumption that any improvements in survival since the 1995 BiOp are a result of BiOp measures, rather than improvements from higher natural flows.
• NMFS makes an assumption that the RPA will reduce FCRPS mortality of adults by 25 percent (which is estimated to improve survival by 7 percent), although no data or analyses are provided to support this claim.
• NMFS selects optimistic assumptions (e.g., minimal delayed mortality) regarding the level of impact attributable to the FCRPS, reducing the hydrosystem burden for conservation and recovery.
• NMFS shifts the conservation burden to habitat, harvest and hatcheries without a biological justification for this shift, or an equitable assessment of appropriate conservation burdens. NMFS makes this shift based on hypothetical "numeric experiments" that focus on total mortality in each life stage, rather than the discretionary mortality above the natural baseline. NMFS also failed to assess the biological feasibility of these actions, the feasibility of implementing these actions quickly, and the feasibility of near-term survival improvements once the actions are implemented. For example, the draft 2000 BiOp and Recovery Strategy present an ambiguous message regarding spawning and rearing habitat in the Snake River basin. On one hand, NMFS shifts a primary focus for recovery to freshwater spawning and rearing habitat, but on the other hand assigns Snake River watersheds a lower priority for habitat measures because habitat measures offer little potential for improvement. The documents also fail to identify specific measures for implementation and a rational basis for assigning expected benefits.

Because NMFS inappropriately shifts the conservation burden away from the FCRPS, the draft 2000 BiOp RPA for hydrosystem actions does not significantly change from current operations. The RPA basically has the same spill, flow and transportation actions identified in the 1995 and 1998 FCRPS BiOps. As a representative of the Technical Management Team for the State of Idaho, I can attest that there were numerous times during the past 5 years that even these provisions were not met.

Step 6: Select a suite of management actions that are likely to provide the necessary survival improvements.

Selection of management actions to address discretionary mortality is a policy decision based on biological and non-biological factors. However, these actions must be based on sound science and address enough of the primary sources of mortality to meet survival and recovery standards. The draft 2000 BiOp and Recovery Strategy fail to identify specific management actions or thoroughly assess the expected contribution of these actions toward necessary survival improvements.

The draft 2000 BiOp concludes that a 30 percent increase in survival estimated from FCRPS improvements of the RPA result in no-jeopardy to Snake River spring/summer chinook, even though not all stocks meet the standard without additional survival improvements. It is not surprising that the CRI analysis indicates some stocks meet the standards because of the numerous optimistic assumptions incorporated into the analysis (Table 1). In contrast, PATH estimated recovery would require approximately a 170 percent increase in survival rates for Snake River spring/summer chinook (Peters and Marmorek 2000).

Our analyses indicate it is highly unlikely for non-breach alternatives alone to provide the necessary survival improvements required for survival and recovery of Snake River salmon and steelhead. Regrettably, the numbers just do not add up. Given the current unacceptability of the natural river option, it is important to implement an aggressive suite of alternative management actions across the lifecycle of the fish, but focused on the mainstem FCRPS. This is important to not only test whether there are viable alternatives to breach, but also to protect and enhance salmon and steelhead as much as possible during the interim. Without these focused and aggressive actions, the 2000 BiOp and Recovery Strategy are more likely to fail because the conservation burden has been shifted to Hs that are incapable of providing the necessary survival improvements.

Through their annual migration plans and involvement in the Regional Forum, NPPC program, and Four Governors Plan, IDFG and the State of Idaho have identified several actions that would more aggressively address significant sources of direct and delayed discretionary mortality than the existing RPA.

• Take immediate actions to improve survival and reduce stress associated with migration through the FCRPS. These actions should focus on improving inriver migration conditions, and spreading the risk among transported and inriver migrants depending on annual river conditions.

Improve reservoir passage.—Shift flood control and reservoir operations to ensure flows in the lower Snake River do not drop below 100 kcfs during the spring migra-

tion period. Investigate alternatives to increase water velocity in the lower Snake (e.g., wing dams, artificial velocity gradients, natural migration channel, etc.).

Improve dam passage.—Implement 24-hour spill to the maximum allowable levels during the spring migration period. Begin research to assess full spill for summer migrants. Alter dams to reduce total dissolved gas. Reduce predators in the forebay and tailrace of the dams. Install Minimum Gap Runner turbines. Reduce adult fallback and passage duration (e.g., better attraction flows, more ladders, etc.). Improve fish bypass system at Lower Granite Dam modeled after the Little Goose Dam bypass system. Investigate and install surface bypass systems at lower Columbia River dams.

- Immediate reduction of avian and pinniped piscivores in the Columbia River estuary to mid-1980's levels. These predator populations are currently robust, whereas salmon and steelhead populations are imperiled. Once fish populations increase, an ecologically appropriate balance of fish, birds and pinnipeds can be managed in the estuary.
- Develop and implement selective fisheries to reduce the take of listed fish while maintaining or increasing access to non-listed or hatchery fisheries.
- Implement more aggressive local watershed initiatives to improve tributary connectivity, flow, water temperature, sediment and nutrient inputs, barrier removal, riparian conditions, and additional irrigation screening and consolidation. Experiment with fertilization of selected spawning and rearing tributaries to assess potential improvement in fish survival and condition. Restore Columbia River estuary habitat and ecosystem functions.

Available scientific analyses indicate these actions will help moderate extinction risk, will increase the frequency of rebuilding opportunities, and will increase the frequency of harvestable hatchery surpluses compared to current operations, even though they are unlikely to provide the magnitude of survival benefits required to secure recovery. If environmental conditions (e.g., annual snowpack, ocean temperature, coastal upwelling) deteriorate during this interim period, then more aggressive actions than those described above should be immediately considered, including the natural river option.

Step 7: Develop an aggressive monitoring and evaluation plan to assess effectiveness within the context of environmental variability.

The draft 2000 BiOp and Recovery Strategy do not identify an adequate monitoring and evaluation program to assess the effectiveness of management actions within 5, 8 and 10 years. It is not scientifically feasible to implement new actions, particularly focused on habitat improvement, and expect to evaluate the effect of these actions on population growth rates within one decade. Thus, many of the performance standards and measures in the 2000 BiOp and Recovery Strategy are relatively meaningless in the context of the breach decision.

Instead, the primary factors that will likely determine whether or not population growth rates are adequate during the next few years are the weather and ocean conditions. If snowpack and ocean conditions are favorable during the evaluation period, population growth rates may meet the standard. If these environmental conditions deteriorate, then it is unlikely population growth rates will meet the standard. Thus, it is very important that performance standards and measures capture the relative influence of these environmental variables.

IDFG is concerned that the draft 2000 BiOp and Recovery Strategy represents a fundamental shift away from an emphasis on recovery to an emphasis on simply avoiding extinction. Recovery standards and performance measures must all point toward the goal of sustainable and naturally diverse fish runs with inherent productivities adequate to meet the biological needs of the fish and provide societal benefits. Performance measures are the means of tracking progress toward recovery standards, and should be nested within a hierarchy to ensure a clear delineation toward recovery. For example, the Primary measure of success should be based on adult returns and overall life cycle survival (adult-to-adult) for naturally spawning indicator populations representing the diverse stock structure of the Snake River basin; Secondary measurements of success should include relative survival among upriver and downriver indicator stocks, smolt-to-adult survival, and egg-to-smolt survival; Tertiary measurements could include partitioning survival more finely within life stages (e.g., survival through the migration corridor) and achieving a desired condition for key ecosystem attributes, such as water quality, quantity and velocity, riparian health, predatory impacts, fish health and condition, etc. It is important that this hierarchical context remains clear, so that tertiary or secondary measurements do not become an "end unto themselves" but rather a means to our primary measures of success.

LITERATURE CITED

Botsford, L.W. 1997. Depensation, performance standards and probabilities of extinction for Columbia River spring/summer chinook salmon. Draft in D.R. Marmorek and C.N. Peters (eds. 1998. Plan for Analyzing and Testing Hypotheses (PATH)): Retrospective and prospective analyses of spring/summer chinook reviewed in FY97. Compiled and edited by ESSA Technologies, Vancouver, B.C.

Bouwes, N., H. Schaller, P. Budy, C. Petrosky, R. Kiefer, P. Wilson, O. Langness, E. Weber, E. Tinus. 1999. An analysis of differential delayed mortality experienced by stream-type chinook salmon of the Snake River. A response by State, tribal, and USFWS technical staff to the 'D' analyses and discussion in the Anadromous Fish Appendix to the U.S. Army Corps of Engineer' Lower Snake River Juvenile Salmonid Migration Feasibility Study. October 4, 1999. Submitted to NMFS for ESA record.

BRWG (Biological Requirements Work Group). 1989. Analytical Methods for Determining Requirements of Listed Snake River Salmon Relative to Survival and Recovery. Progress Report of the Biological Requirements Work Group, October 13, 1994. *IDFG et al.* v. *NMFS et al.*

Congleton, J.L., T. Welker and L. Haley. 1999. Evaluation of the effects of multiple dam passage on physiological condition of migrating juvenile salmon. In Idaho Cooperative Fish and Wildlife Research Unit Annual Report, October 1, 1998 September 30, 1999. University of Idaho, Moscow, Idaho.

Dennis, B. 1989. Allee effects: population growth, critical density, and the chance of extinction. Natural Resource Modeling 3:481–538.

IDFG 1998. Idaho's anadromous fish stocks: their status and recovery options. Report to the Director, May 1, 1998. Idaho Department of Fish and Game, Boise, Idaho.

IDFG 1999. Comments on the National Marine Fisheries Service's "An Assessment of Lower Snake River Hydrosystem Alternatives on Survival and Recovery of Snake River Salmonids" (Draft Anadromous Fish Appendix). August 30, 1999. Idaho Department of Fish and Game, Boise, Idaho.

IDFG 2000a. Technical Comments on the Scientific Analyses Used for the Federal Caucus Draft All-H Paper. March 17, 2000. Idaho Department of Fish and Game, Boise, Idaho.

IDFG 2000b. Technical Comments on NMFS' Draft Anadromous Fish Appendix. April 29, 2000. Idaho Department of Fish and Game, Boise, Idaho.

Marmorek, D.R. and Peters, C. (eds.). 1998. Plan for Analyzing and Testing Hypotheses (PATH): Weight of Evidence Report. ESSA Technologies, Ltd. 1765 West 8th Avenue, Suite 300. Vancouver BC, V6J 5C6. 116 pp. + Appendices.

Marmorek, D.R., C.N. Peters and I. Parnell. 1998. Plan for Analyzing and Testing Hypotheses (PATH): Final Report for Fiscal Year 1998. ESSA Technologies, Ltd. 1765 West 8th Avenue, Suite 300. Vancouver BC, V6J 5C6. 263 pp.

NMFS 1995. Reinitiation of consultation on 1994–1998 operation of the Federal Columbia River power system and juvenile transportation program in 1995 and future years. Biological Opinion. National Marine Fisheries Service. Seattle, Washington.

NMFS 1998. Operation of the Federal Columbia River power system including smolt monitoring program and the juvenile fish transportation program: a supplement to the biological opinion signed on March 2, 1995, for the same projects. National Marine Fisheries Service, Seattle, Washington.

NMFS 1999. Draft lower Snake River juvenile salmon migration feasibility report/environmental impact statement, Appendix A, anadromous fish. Produced by National Marine Fisheries Service for U.S. Army Corps of Engineers, Walla Walla, Washington.

NMFS 2000a. NMFS White Papers: (1) salmonid travel time and survival related to flow in the Columbia River basin; (2) summary of research related to transportation of juvenile anadromous salmonids around Snake and Columbia River dams; (3) passage of juvenile and adult salmonids past Columbia and Snake River dams; (4) predation on salmonids relative to the Federal Columbia River power system. March 2000

NMFS 2000b. Draft Biological Opinion on Operation of the Federal Columbia River power system including the juvenile fish transportation program and the Bureau of Reclamation's 31 project, including the entire Columbia Basin Project. July 27, 2000 (draft). National Marine Fisheries Service, Seattle, Washington.

Peters, C.N., D.R. Marmorek and I. Parnell. 1999. PATH Decision Analysis Report for Snake River Fall Chinook, September 1999. ESSA Technologies, Ltd. 1765 West 8th Avenue, Suite 300. Vancouver BC, V6J 5C6. 332 pp.

Peters, C.N., and D.R. Marmorek. 2000. PATH Preliminary Evaluation of the Learning Opportunities and Biological Consequences of Monitoring and Experimental Management Actions. April 11, 2000. ESSA Technologies, Ltd. 1765 West 8th Avenue, Suite 300. Vancouver BC, V6J 5C6. 154 pp.

Raymond, H.A. 1988. Effects of hydroelectric development and fisheries enhancement on spring and summer chinook salmon and steelhead in the Columbia River Basin. N. Am. J. Fish. Manage. 8:1–24.

Schaller, H.A., C.E. Petrosky and O.P. Langness. 1999b. Contrasting patterns of productivity and survival rates for stream-type chinook salmon (Oncorynchus tshawytscha) populations of the Snake and Columbia rivers. Can. J. Fish. Aquat. Sci. 56:1031–1045.

SRP (Scientific Review Panel). 1998. Conclusions and Recommendations from the PATH Weight of Evidence Workshop. September 8–10, 1998. Vancouver, BC Canada. PATH Scientific Review Panel (S. Carpenter, J. Collie, S. Saila, C. Walters). Edited by C. Peters, D. Marmorek, R. Gregory, T. Eppel. ESSA Technologies, Ltd. 1765 West 8th Avenue, Suite 300. Vancouver BC, V6J 5C6. 32 pp.

STUFA (State and Tribal and U.S. Fisheries Agencies). 2000. A technical review of the National Marine Fisheries Service Leslie matrix model of Snake River spring and summer chinook populations. April 28, 2000. Submitted to NMFS for ESA Record.

Toole, C. 2000. Email memorandum to L. Krasnow and 9 others, September 5, 2000. Subject: [Fwd: New AppB posted]

Factors affecting estimated needed survival improvements	Assumptions considered by NMFS optimistic	---------->	pessimistic		Recommended
Extinction Standard	<1 fish/generation	<90% decline	<50% decline		VSP or BRWG thresholds
Recovery Standard	100 yr	48 yr	24 yr		24 yr and 48 yr
FCRPS Survival Performance Standard	no delayed mort		hydrosystem delayed mort		hydrosystem delayed mortality
Definition of High Risk	<5% prob		<1% prob		
Hatchery Effectiveness	0%	20%	80%	100%	stock specific (for SR spr/sum use 80%)
Population behavior (low pop.)	density dependence w/o depensation	density independence	density dependence (with depensation)		density dependence (w/ depensation)
Population behavior (high pop.)	density independence		density dependence		density dependence
Time Series	1980-2004	1980-present	1990-present		1970-present
Population growth rate	linear		non-linear (declining rate)		account for non-linearity
Factors affecting expected improvement: action & RPA					
Increase juvenile survival from 1995 BiOp	due to hydrosystem improvements	due to model differences	due to flow		use same flow dependent models
Adult survival	7% increase		0% increase		support assumption, else 0%
Survival improvements from					
hatcheries	meets needed improvement	feasible improvements	no improvements		model feasible improvements
habitat	meets needed improvement	feasible improvements	no improvements		model feasible improvements
harvest	meets needed improvement	feasible improvements	no improvements		model feasible improvements
	= Assumptions chosen by NMFS for action agencies responsibility to achieve survival and recovery				

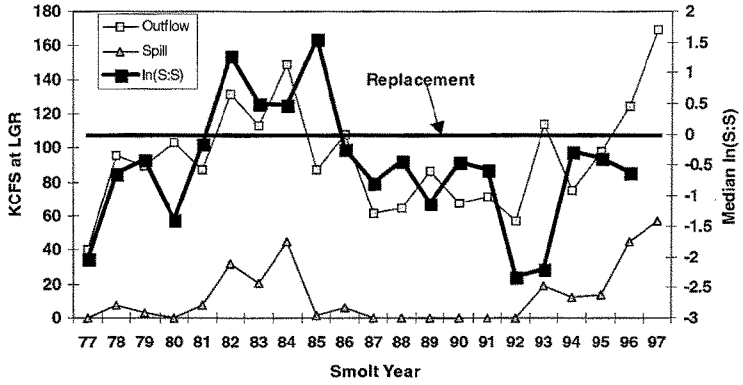


Figure 1. Natural log of ratio of recruits to spawning grounds divided by parent spawners (ln(S:S)) for seven index stocks of Snake River spring/summer chinook used in PATH compared to average flow and spill at Lower Granite Dam (kcfs at LGR) experienced during the springtime smolt migration, 1977-1996. The populations increase when ln(S:S) > 0 and decrease when ln(S:S) < 0.

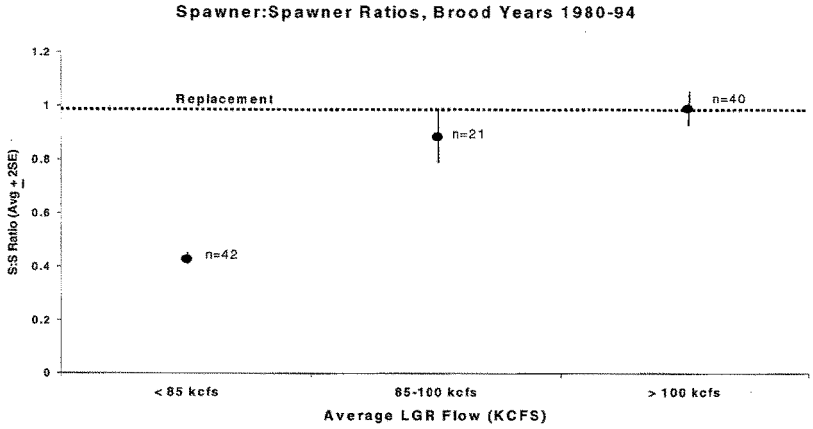


Figure 2. Average spawner to spawner ratio $\pm$ 2 SE for seven index stocks of Snake River spring/summer chinook, smolt years 1977-1996, compared to average flow categories at Lower Granite Dam (LGR). 1995 BiOp flow targets are 85-100 kcfs, which are associated with returns averaging less than replacement. The populations increase when S:S > 1 and decrease when S:S < 1.

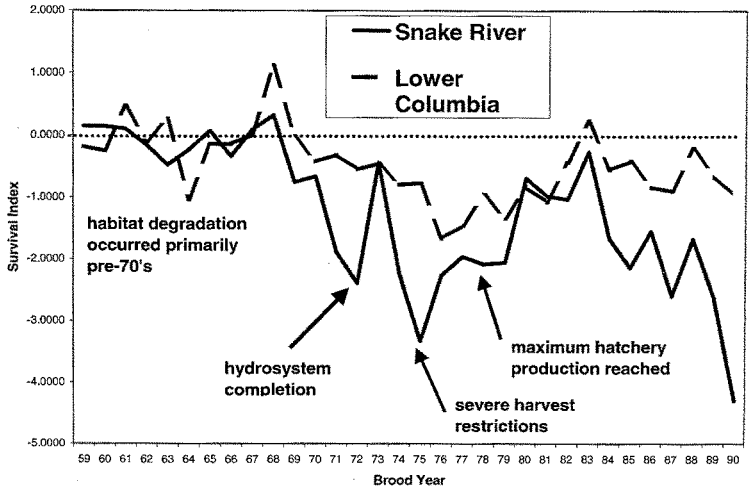


Figure 3. Survival rate index comparisons for Snake River spring/summer chinook and lower Columbia River spring chinook (stream-type), brood years 1959-1990. Survival index values of 0, -1, -2 and –3, represent relative survival of 100%, 37%, 14% and 5% that of the pre-1970 era. Source: Schaller et al. 1999.

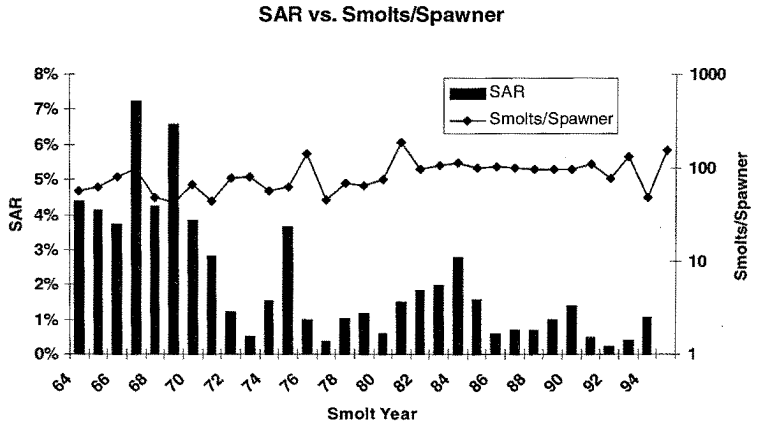


Figure 4. Smolt-to-adult return rate (SAR) and smolts per spawner (log scale) for wild Snake River spring/summer chinook, 1964-1994 migration years. Estimates for 1984-1990 based on predicted wild smolt yield from PATH retrospective analyses. Source: STUFA 2000.

STATEMENT OF KEITH KUTCHINS, ANADROMOUS FISHERIES BIOLOGIST, SHOSHONE-BANNOCK TRIBES, FISHERIES DEPARTMENT

My name is Keith Kutchins, Anadromous Fisheries Biologist for the Shoshone-Bannock Tribes. I deal primarily with anadromous fish harvest, production and hydrosystem issues and assist in subbasin planning. Since 1991 I have been the Shoshone-Bannock Tribes' representative on the harvest and production technical committees of *United States* v. *Oregon*, and I am intimately involved with a plethora of other processes including the planning and implementation activities of the Northwest Power Planning Council, Columbia Basin Fish and Wildlife Authority, Endangered Species Act consultations with the National Marine Fisheries Service and U.S. Fish and Wildlife Service, and fisheries co-management activities with the State agencies and Columbia Basin tribes. I have worked on anadromous fish management issues in the Columbia River Basin for over 12 years.

The Shoshone-Bannock Tribes are today co-managers of the anadromous fish resource in the Columbia River Basin and have continued to work toward improving the habitat and supplementation efforts. The Shoshone-Bannock Tribes are also leaders in pursuing equitable allocation of conservation-based harvest.

I have reviewed the Draft Hydrosystem Biological Opinions by the National Marine Fisheries Service and U.S. Fish and Wildlife Service on the Operation of the Federal Columbia River Power System and the Federal Caucus Draft Basin-wide Salmon Recovery Strategy and am deeply concerned about the failure of these documents to rely on the simple scientific facts that are so evident to the vast array of scientists that work in the Snake River system. The Shoshone-Bannock Tribes have repeatedly invited the National Marine Fisheries Service staff and decisionmakers to visit us in the headwaters of the Columbia River, particularly in the Salmon River system. Unfortunately, few have made this trip to the headwaters.

The vast majority of the habitat in the Salmon River system is in very good health for the salmon life stages that occur there. The Salmon River was once the spawning and rearing habitat of at least 50 percent of the entire Columbia River runs of spring and summer chinook salmon. The Clearwater and Salmon rivers are the exclusive homes of the large Group-B (two-ocean) steelhead. Much of the Salmon River is comprised of relatively pristine habitat—clean, clear, cold un-dammed flowing waters with vast arrays of in-stream habitat such as woody debris, large pool-to-riffle ratios, undercut banks and rich riparian areas that shade the water. This is superb habitat for salmon and steelhead.

However, it does not take much observation to reveal that all this wonderful habitat is relatively devoid of anadromous fish. The spawning beds have very few or no adult salmon and steelhead spawning on them. Annually we count the salmon redds, or spawning nests, as an indication of population abundance. These counts have occurred consistently since 1957 in Idaho in order to follow the trends of abundance. The trend is unmistakably on a consistent downward path, even since the listings of these fish under the Federal Endangered Species Act in 1992.

We also snorkel the rivers in order to estimate the abundance of juvenile fish that have been produced in the Salmon River. This sampling has also been conducted in such a way as to confidently compare abundance from year to year. The trend of juvenile fish abundance is also on a consistently downward path. Just 10 years ago most of the Salmon River tributaries had juvenile salmon densities that were from 10 to 20 percent of the carrying capacity. Now, just one decade later, the Salmon River tributaries contain only 5 percent of the juvenile salmon needed to fill the habitat.

Computer models and fancy statistics are worthless compared to the facts that simple observations have revealed to anyone who has watched the Salmon River for a period of time. The simplest statistics, such as the trends in redd counts and juvenile densities since the late 1970's do not lie. However, the National Marine Fisheries Service appears to ignore these simple statistics. The National Marine Fisheries Service is plain wrong when they conclude that the greatest opportunities for survival improvements of listed Snake River salmon may hinge on efforts to restore health to the tributaries.

Although the habitat in the Salmon River is mostly in excellent health, there are problem areas. The Lemhi and Pahsimeroi rivers and the East Fork Salmon River have vast arrays of irrigation diversions. Although the majority of these diversions are screened to bypass migrating juvenile salmon back into the river, the sheer number of diversions delay the outmigration to the point where the salmon misses its window of opportunity to speed to the ocean, and these delays do result in mortality. There are at least five major mines that pose significant threats in the form of acid rock drainage and cyanide spills and seeps, and a myriad of other small

mines that add additional sedimentation and water quality problems. Many smaller tributaries to the Salmon River, and even the Lemhi River itself are so heavily used for irrigation that they are literally de-watered.

The Shoshone-Bannock Tribes look forward to continuing work as resource comangers with the Federal and State agencies and local individuals and governments to correct problems in the Salmon River primarily in tributaries to the Salmon River from the Lemhi River upstream to the headwaters of the Salmon River. The Shoshone-Bannock Tribes have been proactive participants in these efforts, through the Lemhi River Model Watershed, through actions of the Tribes' Salmon Corps, and through the Tribes' habitat enhancement projects funded by the Bonneville Power Administration. We have documented many cases where localized habitat problems have been corrected, to the benefit of the anadromous and resident fish resources.

However, the Shoshone-Bannock Tribes are thoroughly convinced that these improvements are not nearly enough to even stop the declines of the listed anadromous fish, let alone recover them. Our best evidence of this fact exists in the Middle Fork Salmon River, the largest salmon producing tributary of the Salmon River system. The listed fish populations in the Middle Fork Salmon River—which is a Wild and Scenic River that lies almost completely within the Frank Church Wilderness Area and is almost totally in pristine condition-continue to decline at least at the same rate as the populations in the upper Salmon River. This evidence suggests that the major problems—and thus the major areas to concentrate recovery efforts—are outside of the Salmon River system.

During the early and middle 1990's the conditions in the Pacific Ocean were not good for Columbia River salmon populations. The impacts of oceanic conditions become greater as salmon populations decrease, as do the impacts created by all habitat conditions. The critical, or threshold importance of learning more about how ocean conditions affect salmon survival and recovery is doubtful. Although it is of interest to further study the trends of oceanic conditions and their effects on Columbia Basin salmon, very little can be done by humans to protect the salmon during their time in the ocean, other than reducing or eliminating mixed-stock harvest. The Shoshone-Bannock Tribes applaud the efforts of the National Marine Fisheries Service to reduce harvest impacts on listed Snake River fall chinook over the past 8 years. However, the impacts of 30 percent harvest rates on the fall chinook and listed Group-B steelhead are still too high. The National Marine Fisheries Service needs to more aggressively pursue continuity between conservation-based harvest rates of Columbia Basin spring and summer chinook salmon (approximately 10 and 5 percent, respectively) and the 30 percent harvest rates for fall chinook and steelhead.

The position of the Shoshone-Bannock Tribes is that there should be no interception fisheries in the ocean and mainstem Columbia River while the weak stocks of listed fish are mixed in with more numerous runs. Fisheries should instead be conducted in the tributaries with runs that can support harvest. Selective harvest works best when the fishing area is used as the tool for selectivity, rather than different gears. Selective gears require the catch and then the release of the listed fish, which still results in mortality of the listed fish.

The National Marine Fisheries Service is particularly unjust in its allocation of the conservation burden when they allow ocean and mainstem Columbia River fisheries to harvest listed Snake River salmon and steelhead while at the same time the NMFS states that there is no mechanism under their administration of the Endangered Species Act for Shoshone-Bannock Tribal harvest of those very same fish once the fish are in the Salmon River. The National Marine Fisheries Service is arbitrary when they claim that harvesting listed fish is incidental when the population of fish being harvested is comprised of less than 50 percent listed fish. They are also arbitrary, and capricious when they further claim that harvesting listed fish is direct take when the population of fish being harvested is comprised of greater than 50 percent listed fish.

The National Marine Fisheries Service is wrong to conclude that that there are only two roles for hatcheries. The two roles they state are: (1) reform existing hatcheries to prevent negative effects from hatchery-origin fish on wild fish; and (2) use hatcheries to conserve wild fish. These are good roles for hatcheries. However, the most important role for hatcheries is to use them to rebuild wild fish populations. The Shoshone-Bannock Tribes call this concrete-to-gravel-to-gravel management. Scientists call it supplementation. There are appropriate ways to use hatchery-origin fish and release them into wild areas for those fish to return to rebuild the listed wild populations. The NMFS is wrong to use genetics as the overriding factor in impeding the Shoshone-Bannock Tribes from pursuing the production actions that the Tribes have successfully initiated. Many of the wild areas no longer contain any fish, so even if the NMFS is correct with their genetics theories, it would be

a moot point. We can no longer manage for genes, and need instead to manage for fish. The Recovery Strategy needs to aggressively pursue supplementation of listed fish with available hatchery-origin stocks.

The National Marine Fisheries Service needs to incorporate the use of hatcheries to rebuild listed populations, rather than only use hatcheries as a conservation tool to prevent extinction. The year 2000 is a good example. Largely as a result of very high spring runoff in 1997, the returns of spring and summer chinook to some of the Salmon River hatcheries were excellent during the summer of 2000. So many spring and summer chinook salmon returned to the Rapid River and South Fork Salmon River hatcheries that sportsman harvest occurred alongside treaty fisheries in the rivers directly below those hatcheries. There were so many hatchery salmon that the hatcheries trucked the fish back down below the fisheries for the fish to swim through and have another chance at being harvested after they had already returned to the hatchery weirs.

The Shoshone-Bannock Tribes firmly believe that these "surplus" fish should have also transplanted into adjacent areas that are devoid of listed, naturally producing salmon. For example, surplus adult salmon and their offspring that returned to the Rapid River hatchery should have been transplanted to the Yankee Fork Salmon River, upper Salmon River and Pahsimeroi River. These target areas have received outplantings from the Rapid River stock in the 1980's, and some of those actions returned fish at 2 to 6 percent smolt-to-adult survival rates. During the middle 1980's, one million smolts from the Rapid River Hatchery were released each of 2 years to the Pahsimeroi River, and those releases returned 4,000 to 6,000 adult salmon 2 and 3 years later. Unfortunately, that practice was ended when it was decided that the Rapid River stock was the wrong stock (spring chinook) to use in the Pahsimeroi River (theoretically, summer chinook), even though the performance of those outplantings suggest otherwise. This year, only about 350 adult salmon returned to the Pahsimeroi Hatchery.

Likewise, the "surplus" chinook salmon adults that returned to the South Fork Salmon River this year should have been transplanted to Johnson Creek (a tributary of the South Fork Salmon River), and to the Pahsimeroi River. However, the National Marine Fisheries Service determined that the South Fork Salmon River has five distinctly different stocks of chinook salmon that cannot be intermixed. In essence, the National Marine Fisheries Service theories on salmon genetics are preventing recovery because those theories prevent using abundant, available, and appropriate donor stocks from being used in areas that need fish.

The Shoshone-Bannock Tribes humbly request that the subcommittee further investigate the policies and positions of the National Marine Fisheries Service with regard to salmon supplementation. A very powerful recovery tool is being ignored due to potentially esoteric genetic theories. With great respect, we further request that the subcommittee assists the Shoshone-Bannock Tribes in securing the salmon supplementation actions that we have been pursuing for over 10 years, to at least allow us to also test our theories.

The Shoshone-Bannock Tribes are also very concerned that the National Marine Fisheries Service concludes that there have been significant improvements to the migration conditions through the hydrosystem in the past 5 years. The evidence based on simple observations of wild salmon abundance in the Salmon River system does not support this conclusion. Redd counts and juvenile densities continue to decline, as I have stated earlier.

The National Marine Fisheries Service greatly underestimates the necessary survival improvements that are needed to stop the declines and move toward recovery. The 1995 hydrosystem Biological Opinion concluded that the smolt-to-adult survival needs to improve from 280 to 850 percent in order to meet the 24-year survival standard. The current draft Biological Opinion concludes that survival improvements need to only be 30 percent for Snake River spring and summer chinook salmon.

The National Marine Fisheries Service underestimates the risk of extinction when they use an absolute extinction risk threshold of one fish per brood. It is wrong for the National Marine Fisheries Service to use a one fish per brood extinction risk threshold for evaluation of the hydrosystem, when they use a threshold population level of from 150 to 300 fish per brood for determining allowable tributary harvest levels. The National Marine Fisheries Service further underestimates the probability of real extinction for the listed species by relaxing the definition of high-risk from a 1-percent probability of extinction in 100 years (A-Fish Appendix to the U.S. Army Corps of Engineers Draft Environmental Impact Statement on the Lower Snake River Juvenile Salmon Migration Feasibility Study) to a 5 percent probability in 24 to 100 years.

These are but a few of the many concerns that we have about the ever-changing science used by the National Marine Fisheries Service in the draft Biological Opinion and Recovery Strategy. It appears that the National Marine Fisheries Service picked an analysis method in order to meet the desired end. They do not use the same jeopardy, survival and recovery standards in these drafts as they did in the A-Fish Appendix and in the 1995 Biological Opinion. They do not even use consistent standards between different sections (different "H's") of these drafts. The science that was agreed to as a result of the *Idaho* v. *NMFS* lawsuit appears to no longer apply. That lawsuit resulted in a 1995 jeopardy opinion for the hydrosystem, and established a robust scientific process (the Plan for Analyzing and Testing Hypotheses, or PATH) to continue the efforts to resolve critical scientific uncertainties that remained. The PATH concluded that the benefits from breaching the four lower Snake River dams were more certain than non-breaching alternatives. The National Marine Fisheries Service has boldly rejected that science and has replaced it with a new and different science that concludes that there is significant uncertainty with breaching the lower Snake River dams.

The Shoshone-Bannock Tribes are extremely disappointed that the 1995 Biological Opinion has not been adhered to. That Opinion allowed a decision to be made in 1999 to either breach the lower Snake River dams or else continue with attempts to fix the dams with screens, curtains, bypasses and barges. The Shoshone-Bannock Tribes believe that technological fixes to the lower Snake River dams will not even allow the listed Snake River salmon to survive, let alone recover. The 1999 decision should have been made based on readily available scientific information, and it should have been to pursue congressional authorization to breach those dams, as the Shoshone-Bannock Tribes have long been advocating. The Recovery Strategy and the new Biological Opinion should call for the breaching of the four lower Snake River dams now. The Recovery Strategy and the new Biological Opinion should call for an immediate moratorium on any expenditures on those four dams that will be rendered a wasted investment when the dams are breached.

The bottom line is that the draft Biological Opinion does not state how it will be able to reject the null hypothesis that the Reasonable and Prudent Alternative results in no survival improvement over existing conditions. In other words, the Draft Biological Opinion does not define what we are measuring for in order to determine, 5, 8, or 10 years from now, if there has been a change in the jeopardy of the future existence of the listed fish. It does not tell us how, in 5, 8, or 10 years, we will determine if the Reasonable and Prudent Alternative has succeeded in the listed fish survival or recovery. The Shoshone-Bannock Tribes now see that the implementation of the 1995 Biological Opinion was a trap—a trap that somehow allows the science to change in the eleventh hour with no consultation with the tribes.

The Shoshone-Bannock Tribes are adamant that the new Biological Opinion must incorporate the conclusions of the PATH reports, adhere to the 1995 Biological Opinion, and call for the immediate breaching of the four lower Snake River dams. If the National Marine Fisheries Service can prove, using the best available science, that breaching the dams will result in greater uncertainty than the non-breach alternatives, then the new Biological Opinion must provide clear decision criteria that will be used in less than 3 years to determine the success or failure of the proposed Reasonable and Prudent Alternative. The new Biological Opinion must also provide a clear alternate Reasonable and Prudent Alternative that calls for immediate pursuit of breaching the four lower Snake River dams if the criteria concludes that the proposed RPA results in failure of survival for the listed Snake River fish.

Thank you subcommittee, and Chairman Crapo for hosting this hearing and providing the Shoshone-Bannock Tribes with an opportunity to express their concerns.

STATEMENT OF EARL C. WEBER, SENIOR FISHERIES SCIENTIST, COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION ON SALMON RECOVERY

Mr. Chairman and members of the subcommittee, thank you for this opportunity to present you with my scientific perspective on salmon restoration in the Columbia River basin. My name is Earl Weber. I am a Senior Fisheries Scientist on staff at the Columbia River Inter-Tribal Fish Commission. The Commission was formed in 1977 by resolution of the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Confederated Tribes and Bands of the Yakama Nation. The Commission allows for coordination amongst the four tribes and provides technical assistance to ensure that the resolution of outstanding treaty fishing rights issues guarantees the continuation and restoration of the tribes' fisheries into perpetuity.

1. INTRODUCTION

On behalf of the tribes, I am providing this testimony as a Fisheries Scientist involved in the Plan for Analyzing and Testing Hypotheses (PATH). Several years ago the National Marine Fisheries Service (NMFS) initiated the PATH process as a means of evaluating potential management actions aimed at restoring Snake River stocks. PATH has employed a decision analysis framework that takes uncertainties with respect to these potential management actions into account. More importantly, PATH held rigorous, formal scientific debates that included a weight of evidence approach for evaluating scientific evidence, including the potential for salmon recovery through actions other than additional management actions or modifications of the hydroelectric power system.

In its Draft Biological Opinion (BIOP) on the Operation of the Federal Columbia River Power System, released July 27, 2000, the NMFS acknowledges the high risk of extinction for ESA-listed salmon stocks in the Snake River. NMFS also acknowledges that breaching the earthern portions of the four dams on the lower Snake River provides the best opportunity for recovering these listed stocks. However, rather than recommending breaching, NMFS postpones breaching these dams in favor of other actions. These proposed actions largely consist of unspecified efforts to improve survival in non-hydropower system areas and a continued reliance on the transportation system to mitigate for hydropower system losses.

In taking this stance, NMFS has ignored available technical information developed by the PATH and other technical experts. Nor has NMFS attempted to analyze and arrange information in a way that illuminates a path between the proposed actions and recovery for all listed stocks of salmon. First, NMFS has taken only selected, optimistic pieces of information from the total amount available through the PATH process. Second, NMFS has failed to look at the information from the standpoint of the feasibility of management actions to recover all listed Snake River salmon stocks.

2. TESTIMONY

My testimony focuses on two general areas that have been the focus of PATH in recent years. First, my testimony will provide evidence that transportation is not mitigating for hydropower system losses and that other factors are not responsible for hampering what might otherwise be a successful transportation program. Second, my testimony will show why it is unlikely that recovery will be achieved by improving survival in non-hydropower system arenas.

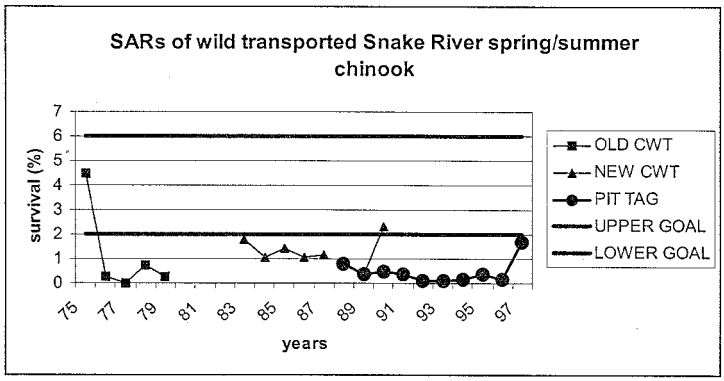
2.1. Transportation

The BIOP tacitly assumes that transportation is mitigating for hydropower system losses. In making their case for the continued transportation of juvenile salmon in barges, NMFS first omits important information useful for evaluating transportation and, second, tacitly supports the hypothesis that transportation is working but that other factors are masking its success. Neither of these assumptions is supported by scientific evidence. In fact, available scientific evidence shows transportation to be a failed management tool for the recovery of salmon stocks.

2.2. Transportation—does it work?

Historically, transportation was evaluated by comparing the survival of transported fish with that of non-transported fish. Two groups of fish were marked and one group was placed in the barge or truck (transport group) and the other group was released back into the river as a "control." The survival rate of each of the two groups of fish was calculated when they returned to the river as adults. The ratio of their survival rates was then calculated. If the Transport-to-Control-Ratio (TCR) was greater than 1:1, transportation was deemed successful.

However, in a review of the juvenile transportation program, Mundy et al. (1994) found the TCRs were "moot" if the survival of the transported fish was not high enough to insure survival of the stock in the long term. Typically, the Smolt-to-Adult survival of the transported fish stocks was much less than 1 percent. PATH concurred and established a survival goal for spring/summer chinook of from two to 6 percent, based on the past survival of Snake River chinook and recent estimates from a downriver index stock , Warm Springs spring chinook (Toole et al 1996). The following graphic shows the Smolt-to Adult-Return (SAR) of transported wild Snake River spring/summer chinook.



Note that in recent years (1988–1997) SARs were measured with highly accurate Passive Interrogation Transponder (PIT) tags. During this period the average survival rate was less than 0.5 percent, far less than the minimum goal of 2 percent and an order of magnitude less than the 4-percent which is approximately the level needed for recovery. The survival goals and the survival information developed by a panel of interagency agency and trial technical experts (PATH), including NMFS staff, was omitted from the BIOP.

Interestingly, the recent PIT tag data also shows that transportation may not be affording even a relative advantage over smolts (juvenile fish) migrating down river through the turbines of the dams. For example, Kiefer (in prep) found that juvenile Snake River spring chinook that migrated to the ocean through the hydrosystem without being handled or bypassed returned at rates above those of transported fish in two of 3 years for which data are available.

Low SARs are consistent with other studies of Snake River Spring/summer chinook. Deriso et al. (1996) and Schaller et al. (1999) analyzed adult (recruit per spawner) data and found that the differential mortality between seven Snake River spring chinook stocks and six downriver control stocks averaged approximately 0.17 per project, which equates to a mortality of over 80 percent for eight projects. Because this level of mortality was far in excess of that indicated by passage models, a statistic, D, was formulated to quantify the level of differential mortality due to collection and transportation relative to the delayed mortality experienced by fish migrating inriver.

Like their predecessors, the Transport-to-Control Ratios, D values are not in and of themselves important. While D values close to one are better than D values close to zero, NMFS asserts that high values of D indicate differential mortality is due to something other than problems with the transportation program. D values are important in an analytical sense only if it can be assumed that differential mortality has nothing to do with the hydropower system. Therefore, it is incumbent on NMFS to explain the source of extra mortality. To date, NMFS has referred to genetic differences between Snake River spring chinook and their downstream control stocks. But genetic differences are not by themselves agents of mortality and must be at least conceptually linked to one or more biological mechanisms. These would include starvation, predation or disease.

It is unrealistic to believe that some stocks of the highly migratory chinook would suddenly find themselves unable to locate prey in the North Pacific. The trophic structure of the eastern North Pacific Ocean is based on large scale wind driven upwelling events that produce large, temporary gyres. These gyres bring cold, nutrient rich water to the surface where food chains forms. Gyres repeatedly form and dissipate throughout the range of spring/summer chinook, which extends from Northern California to the Gulf of Alaska. Because both the Snake River chinook and their downriver (control) counterparts occur within this range, it seems unlikely that the Snake River chinook would become unable to locate prey while the downriver stocks continue to feed successfully. Likewise, it is difficult to believe that Snake River fish would begin to encounter a previously unencountered predator while the downriver fish proceed unmolested.

Although some have emphasized the importance of ocean cycles, the fact that all Snake River salmon stocks obviously haven't collapsed every sixty years, or on any other potential cycle, indicates that a climatic cycle is not to blame. Instead, this

hypothesis would seem to require that a new and unexplained oceanic phenomenon would have to have come into play coincidentally with the construction of the last four dams. It is important to note that during PATH's Weight Of Evidence process, the Scientific Review Panel assigned very low weights (ranging from a 1 percent to a 20 percent likelihood) to the Regime Shift Hypothesis as shown in the following table:

Reviewer	Car-penter	Collie	Saila	Walters
Weight	0.01	0.1	0.15	0.2

Overall, these were the lowest weights assigned by the SRP for any hypothesis. NMFS ignored the Scientific Review Panel and the Weight Of Evidence process in the BIOP.

Conversely, disease appears to be a likely contender for the differential mortality. In fact, NMFS described a scenario over a decade ago wherein a combination of stress and injury sustained during bypass, collection and transportation, causes the ubiquitous but generally asymptomatic Bacterial Kidney Disease (BKD) to flourish (Williams 1989). This phenomenon is well known among fish pathologists (see for example Warren 1991). BKD takes several months to run its course and thus mortality would not occur until the early ocean life stage, the stage at which differential mortality is thought to occur. If NMFS now believes this hypothesis to be untrue, they should provide a more plausible explanation.

To summarize, D values, like Transport-to-Control Ratios (TCRs), are relative measures used to relate the survival of transported fish to that of inriver fish. There is no logical reason to believe that high D values exonerate transportation. High values of D are only important in a quantitative sense if one assumes that differential mortality is unrelated to stress and injury in the hydropower system. The only plausible hypothesis for delayed mortality is linked directly to the hydrosystem. If NMFS wishes to provide a more plausible scientific hypothesis for extra mortality, they need to provide a biological mechanism whereby, 12 to 13 million years after speciation, and concurrent with the development of the hydropower system, the Snake River spring chinook stocks underwent severe declines that the downriver control stocks did not experience.

3. POTENTIAL FOR RECOVERY THROUGH OTHER H'S

The major thrust of the BIOP is that salmon restoration may be possible entirely through improvement in areas other than the hydropower system (i.e., through additional restrictive management actions in habitat, hatcheries and harvest.). This assumption is contradicted by available technical information.

3.1. Habitat

While good habitat is important, one must remember that there are wilderness areas in the Snake Basin yet there are still dwindling spring chinook populations. For example, Sulfur Creek and Marsh Creek are in prime habitat areas. But in 1994 and 1999, no fish returned to Sulphur Creek and in 1995 and 1999 no fish returned to Marsh Creek. It is, therefore, unrealistic to assume that habitat improvement alone will recover spring chinook stocks. Likewise, there are no identifiable opportunities for recovering the Snake River sockeye stock through habitat manipulation.

The greatest "habitat" problem for fall chinook is the severe reduction of spawning habitat caused by the Hell's Canyon dam complex that blocked upstream migrations, and the lower Snake River dams that encroached on their remaining spawning area downstream of Hell's Canyon. NMFS acknowledges that the removal of the four lower Snake River dams will increase spawning and rearing habitat up to 77 percent, with the potential to add 5,000 spawners.

Note also that some of the more important habitat problems are found within the hydropower system. These include nitrogen gas super saturation, elevated water temperatures and the substantial reductions in water velocities that occur in reservoirs. These water quality issues affect all Snake River salmonids and other anadromous and resident fish.

3.2. Harvest

With spring chinook harvest rates in the range of seven to 9 percent, opportunities for recovery through harvest reductions are almost nonexistent. Harvest rates

for Snake River summer chinook and sockeye stocks are lower than those for the Snake River spring chinook stock. At least temporarily, improvements in escapements through harvest reductions are possible for fall chinook and, to a lesser extent, steelhead, but that will not benefit spring/summer chinook or sockeye.

3.3. Hatcheries

This approach has several potential facets. Hypothetically, high densities of hatchery fish could negatively impact Snake River wild stocks. But four of the seven Snake River spring/summer indicator stocks, including the aforementioned Sulphur and Marsh Creek stocks, have no hatchery programs. For these and many other stocks a reduction or elimination of hatchery fish is impossible.

A second hypothesis suggests that hatchery fish, particularly the larger steelhead, may stress spring/summer chinook in the unnatural bypass/collection systems and barges. This further stress, mixed with injury and disease transmission (Williams 1989), appears to be the most likely reason for the low survival of transported spring chinook. However, recent data show that even when steelhead are absent or present in low densities, survival rates (SARs) for chinook are often zero and always less than 1 percent (Peters and Marmorek 2000; Appendix D). One could reasonably question the wisdom of dismantling a moderately successful program (hatchery steelhead) in what would appear at the outset to be a fruitless attempt to raise transportation survival to the 2 to 6 percent range.

4. CONCLUSION

Mr. Chairman, that concludes my testimony. I am prepared to answer your questions, or those of other committee members, now. I am also available to answer any written questions that you wish to provide to me for the benefit of the record.

5. LITERATURE CITED

Peters, C.N. and D.R. Marmorek. (compls./eds.) 2000. PATH: Preliminary evaluation of the learning opportunities and biological consequences of monitoring and experimental actions. Prepared by ESSA Technologies Ltd., Vancouver, BC, 150 pp.

Toole, C., A. Giorgi, E. Weber and W. McConnaha. 1996. Hydro decision pathway and review of existing information. In: Marmorek, D. (ed). 1996. Plan for Analyzing and Testing Hypotheses (PATH): Final Report on Retrospective analyses for fiscal year 1996. Prepared by ESSA Technologies Ltd., Vancouver, BC.

Schaller, H.A., C.E. Petrosky and O.P. Langness. 1999. Contrasting patterns of productivity and survival rates for stream-type chinook salmon (Oncorhynchus tshawytscha) populations of the Snake and Columbia Rivers. Can. J. Fish. Aquat. Sci. 56: 1031–1045.

Warren, J.W. 1991. Diseases of hatchery fish. U.S. Fish and Wildlife Service, Pacific Region Publication. 90 pp.

STATEMENT OF DERREK BATSON, IDAHO STEELHEAD AND SALMON UNLIMITED

Chairman Crapo, and Senators of the committee, my name is Derrek Batson. I am an officer of Idaho Steelhead and Salmon Unlimited—or ISSU—and reside in Nampa, Idaho.

First, let me say that anytime I get east of Senator Crapo's hometown of Idaho Falls my knees begin to shake and I feel a little bit over whelmed. However it is such a great honor to be part of this important process and I have convinced myself I will be just fine.

ISSU was formed in 1984 by a diverse group of businessmen, guides, conservationists, sport fishermen and concerned citizens from throughout the Columbia River region to restore, protect, and preserve the region's steelhead and salmon resources. So as you can imagine ISSU is no stranger to this issue or the process.

We know why Senator Crapo and other Northwestern senators care about salmon restoration—because salmon are in their back yard. But why should the rest of you or your constituents care? One reason is because protecting and restoring what were once the worlds largest runs of salmon and steelhead—and this icon of the northwest—it's the only thing to do. But another reason, and one which we believe is as important to your constituents is that most of the rest of the Nation view our area as their national playground. Our wilderness areas, white water rivers, and massive expanses of Federal lands are intriguing to them and they come to our State by the thousands to recreate in these areas. In Idaho today tourism is the No. 2 industry. It is surpassed only by agriculture. A limited steelhead fishery on hatchery-reared steelhead generates over $92 million annually for our State. We have not had a general salmon season since 1978—only 3 years after completion of the Lower Snake

River Dams—but it is estimated that it would equal or exceed the steelhead fishing economy. So, as you can see we will wear the title of national play ground proudly and restoring salmon needs to be a key part of it. When your constituents come to Idaho they deserve to be able to enjoy this northwest icon.

Briefly allow me to highlight where the Federal BiOp fails the salmon.

For the Federal Caucus to separate the mainstem Columbia and Snake Rivers—with their hydropower obstructions—from habitat is a misnomer Habitat is habitat—whether it is in the Frank Church River of No Return Wilderness or the dam-choked reservoirs in the Mainstem Columbia and Snake Rivers. For the BiOp to focus on the fresh water habitat in Snake River tributaries while ignoring the Federal dams and reservoirs is a prescription for failure. Idaho's wilderness salmon bedrooms are as pristine today as they were a hundred years ago, yet no salmon return. Wild salmon in the Middle Fork Salmon River, South Fork Salmon River and most-other Idaho tributaries pass no irrigation diversions, yet NMFS wants to focus on screening irrigation diversions. Granted it's probably politically non-controversial, but it does nothing to recover wild salmon in these wilderness areas. The BiOp caps—and in some cases reduces fishing—when fishing today is a mere fraction of what it was before the dams were built in the lower Snake River. This is the fallacy of the BiOp. It attacks land users and fishermen. Loggers, miners. ranchers, farmers and fishermen are all victims of the Federal dams, yet the BiOp continues to punish these victims. Land-use industries sacrificed much to set aside the Frank Church River of No Return Wilderness and the Selway Bitterroot Wilderness to protect salmon and steelhead. Combined these two wilderness areas comprise the single largest contiguous wilderness in the lower forty-eight States. Fishermen have not kept wild Snake River spring chinook salmon in the Columbia or Snake River since 1978—or wild summer chinook since the late 1960's. Yet every wild stock is listed by the ESA. To do more of the same while ignoring the No. 1 salmon killer—the Federal dams in the Lower Snake River—quite frankly this is inconceivable.

Allow me to give you an example of the half-heartedness of the BiOp. *Specific Performance Standards; Draft BiOp 9–7 to 9–15*—Agencies are required to meet three overall types of performance standards: programmatic (e.g., did the agencies implement the required measures, did they complete the required analysis, and did they acquire funding necessary to implement and complete these measures and analysis) biological; (i.e. population growth rates), and finally physical; (e.g. spawner counts, riparian health, water quality). There are only consequences for failure to meet the biological standard.

Here is our take of this—First NMFS has yet to define the physical and programmatic standards—this is a major omission at the very heart of the BiOp. Second, the current biological performance standard is based on assumptions and data that do not adequately represent population growth rates for Snake River salmon and it does not include other biological factors (for instance, population distribution necessary for recovery). Third, specific consequences for failing to meet any of the three types of standards should be incorporated into the BiOp.

It is important to emphasize here: performance standards are the means by which NMFS proposes to make this plan work to restore salmon. Yet in the draft document the performance standards are incomplete or missing all three types of standards and there are no consequences for failing to achieve two of the three types of standards.

The Save Our Wild Salmon Coalition has done an outline of the draft recovery plan. I have included it in the material package you now have. I hope you will take time to review it in its entirety.

In closing let me assure you that ISSU has no agenda to just breach dams. Our agenda is to restore a viable anadromous resource to the Columbia Region even if it means breaching the lower Snake River dams. We will accept any plan that will assure recovery of salmon to harvestable, sustainable levels. To date we have not seen one that can do that without breaching the lower Snake River dams, nor do we believe we ever will.

Thank you for allowing me this time before you, and I will try to answer your questions.

STATEMENT OF SCOTT BOSSE, IDAHO RIVERS UNITED

I would like to thank Sen. Crapo and the distinguished members of the subcommittee for inviting me to testify today. My name is Scott Bosse. I am a fisheries biologist with Idaho Rivers United, a river conservation group of nearly two thousand members from Idaho and across the Pacific Northwest that has been working on Columbia basin salmon recovery since our founding a decade ago.

I would like to address three major points in my testimony on the Administration's draft biological opinion and the Draft Basin-wide Salmon Recovery Strategy, formerly know as the All-H paper.

The first is the premise that because there are now 12 ESA-listed stocks of salmon and steelhead in the Columbia basin, any and all recovery measures must target all of these stocks at once. In other words, the idea is that we should pursue a "one-size-fits-all" salmon recovery strategy in order to get the most "bang for the buck." This goes against one of the most important things biologists know about salmon; that each individual stock is uniquely adapted to the river that produced it. That is precisely why the Endangered Species Act protects salmon at the stock level, and not at the broader species level.

Saying we should not take out the four lower Snake River dams because it would only help four out of the 12 listed stocks is akin to saying we should not cleanup the air in Boise because that does nothing to improve air quality in Houston or Phoenix. It is simply another excuse for inaction.

The fact is that the four listed stocks in the Snake River basin face a very different set of hurdles than the eight listed stocks in the Columbia River. While most tributary habitat in the Columbia River has been severely degraded by logging, mining, grazing, urbanization, and agricultural development, the Snake River stocks still have available to them nearly four thousand miles of prime spawning and rearing habitat. Approximately one-third of this habitat is located within federally designated wilderness areas or Wild and Scenic River corridors. This virtually pristine habitat theoretically is capable of producing millions of wild smolts that should translate into several hundred thousand wild returning adult salmon.

The administration contends there are four Hs that must be addressed in order to develop a truly comprehensive basin-wide recovery strategy. In reality, there are only three: Habitat, Harvest, and Hatcheries. The notion that Hydro deserves its own H is false. It does not. Hydro is habitat. Hydroelectric dams on the lower Snake and Columbia Rivers have drastically altered the 465 mile-long migration corridor habitat that Snake River salmon rely on to in order to deliver them to the estuary when they are smolts and back to their spawning grounds when they are adults. The dams have transformed what once was a cold, swift-flowing river into what is now a chain of warm, slackwater reservoirs in which salmon are not genetically equipped to survive.

Hydroelectric dams also have inundated 140 miles of mainstem spawning and rearing habitat for Snake River fall chinook salmon. By largely ignoring the Hydro H and trying to make up for it in the other three H's, the draft bi-op essentially writes off this stock. This shortcoming is especially problematic because it is fall chinook that are most sought after by tribal harvesters who have treaty rights that this administration has pledged to uphold.

The second major point I want to address is the draft biological opinion's strong focus on habitat restoration in upriver tributaries and the Columbia River estuary in lieu of the major overhaul in the Hydro H that Judge Marsh called for in 1994 (*Idaho Department of Fish and Game* v. *NMFS*). Mr. George Frampton, Acting Chair of the White House Council on Environmental Quality, has estimated that expenditures on these items alone will cost taxpayers and ratepayers hundreds of millions of dollars a year above and beyond what is already being spent.

A fair question, then, is what will this money buy in the 3,700 miles of prime spawning and rearing habitat that lies nearly empty of salmon in Idaho and northeast Oregon? What will it buy in the Middle Fork Salmon River—drainage the largest wild salmon refuge left in the Columbia basin—where the habitat cannot be improved upon, where there are no hatcheries, and where the spring/summer chinook that return to spawn face a combined harvest rate of less than 5 percent? What will a plan that does virtually nothing to overhaul the Hydro H do for these salmon stocks that are almost wholly affected by the dams?

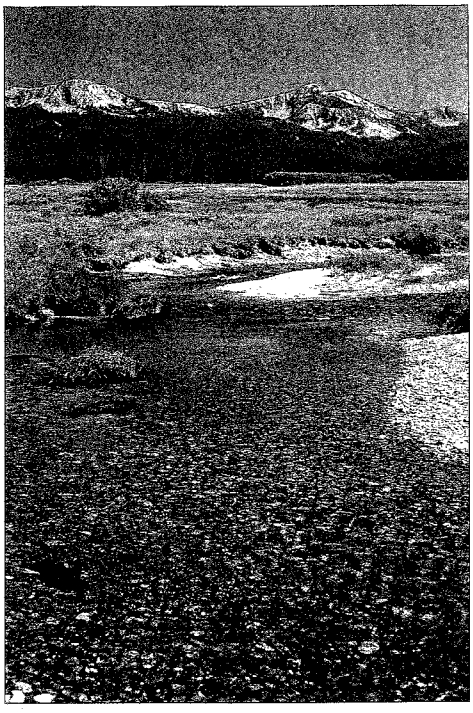
NMFS scientists justify their focus on tributary habitat restoration by saying the best opportunity to increase population growth rates is in the salmon's first year of life. But the science shows Snake River salmon have experienced no significant decrease in egg-to-smolt survival since the construction of the lower Snake River dams. The science also shows that Snake River salmon declines have been similar in pristine and badly degraded streams; in streams with high natural fertility and those with low natural fertility.

The bottom line is NMFS has fundamentally misdiagnosed the most critical problem facing 4 out of the 12 listed Columbia basin salmon stocks by largely ignoring the Hydro H and trying to pin the problem on first year survival. The facts clearly do not support this assumption.

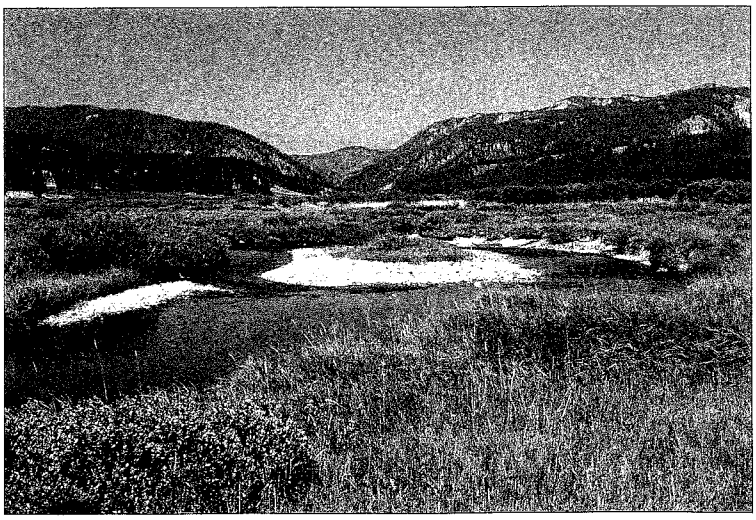
Finally, I want to point out that the remedies prescribed in the draft biological opinion are not time-sensitive for at least two of the four listed Snake River stocks

(spring/summer chinook and sockeye). That is, restoring spawning and rearing habitat—even if it was the most critical factor affecting Snake River stocks—would undoubtedly take decades to produce the desired effect, when extinction models show some of these very same stocks are on a trajectory to go functionally extinct by 2017. The fact remains that the only recovery measure that is likely to restore spring and summer chinook within a timeframe that will beat the extinction clock is breaching the four lower Snake River dams.

Speaking at a July 27 press conference in Portland, Mr. Frampton was quoted as saying, "We know dam breaching is the single most effective thing we can do for these (Snake River) stocks and that it may be necessary." I believe that in addition to being the single most effective thing we can do, dam breaching is also the only major thing we can do to actually recover Snake River stocks before the extinction clock runs out. Until the administration's draft recovery plan acknowledges that basic fact, it is a recovery plan for just 8 of the 12 listed stocks, and a weak one at that.



Marsh Creek
Middle Fork Salmon River drainage, Idaho



STATEMENT OF ROBERT J. MASONIS, DIRECTOR, NORTHWEST REGIONAL CONSERVATION PROGRAMS, AMERICAN RIVERS

Good afternoon Mr. Chairman and other distinguished members of the subcommittee. Thank you for inviting me to testify before you today regarding the Administration's draft plan to save Columbia and Snake River salmon. I am the Director of Northwest Conservation Programs for American Rivers, a national river conservation organization, and Board Chair of the Save Our Wild Salmon Coalition, a coalition of over 50 commercial fishing associations, sport-fishing groups, fishing-related businesses and conservation organizations from across the Northwest. American Rivers and the Save Our Wild Salmon Coalition have been active for many years in the effort to recover salmon and steelhead in the Columbia and Snake Rivers.

The recent release of the National Marine Fisheries Services' draft Biological Opinion was an important milestone in the region's effort to develop a recovery plan for the listed salmon in the Snake and Columbia River Basins. The challenge now is to improve the draft and finalize it on schedule by the end of 2000. One issue that is clearly not disputed among scientists is that the time to act is now if we are to recover salmon and steelhead in the Columbia Basin; further delay is unacceptable.

Let me start by stating that we believe the general framework set forth in the draft Biological Opinion represents a workable, logical approach to addressing this extremely complex issue. While we support this general framework of action and adaptive management, we believe that the draft Biological Opinion is severely lacking in several critical respects, including the adequacy of the specific remedial actions and the implementation timeline. I will explain these concerns in more detail in a moment.

I would also like to acknowledge the efforts of the National Marine Fisheries Service scientists who have worked hard over the last year on the Cumulative Risk Initiative. They have made significant contributions to our understanding of the current, tenuous State of Columbia and Snake River salmon. Their work has shown that many of the listed stocks are at high risk of extinction in the short term, and that we must move forward with aggressive, effective actions if we are to get these stocks on the road to recovery before it is too late.

But the draft Biological Opinion suffers from several deep flaws that must be remedied if it is to pass scientific and legal muster.

First, the draft Biological Opinion largely ignores the extensive, sound analysis of the team of Federal, State, and tribe scientists known as PATH. There are other witnesses, including PATH representatives, who are better equipped to address the crucial differences between CRI and PATH, and the failure of the draft Biological Opinion to adequately address the PATH findings, so I will not cover that same ground here. But it is abundantly clear to us that during the last year the National Marine Fisheries Service has largely taken the science "in house" and failed to adequately consult with the other Federal, State, and tribal scientists, including those who were part of PATH. Consequently, in several critical areas NMFS has substituted its own scientific judgments for those of the PATH scientists without analysis demonstrating that the PATH findings and judgments are flawed.

Second, the aggressive, non-breach recovery actions the Administration has touted as the cornerstone of the draft Biological Opinion are, in fact, not there. Instead, the document sets forth laudable objectives, promises tough performance standards (to be developed at a later date), and then sets forth a list of actions that consist mostly of studies, investigations, pilot projects, and planning processes. Remarkably, the hydropower system measures are essentially the same as those set forth in the 1995 Biological Opinion, with no hard flow requirements and a continued reliance on fish barging, a practice which has been roundly and deservedly criticized by the region's scientific community.

For example, proposed measures include: a 2-year study by the Bureau of Reclamation to determine the extent of unauthorized water use in the basin, and a 5-year draft feasibility analysis of potential changes in existing flood control operations to aid salmon. These purportedly "aggressive" actions will not save one fish in the near term, and may not ever.

Our point is not that these steps are not worthy of pursuit, they are, but they are not measures that will boost listed stocks in the short and long term. Such actions would include requiring adequate flows in all tributaries containing spawning habitat or requiring sufficient flow augmentation to provide for the migratory needs of salmon and steelhead. The final Biological Opinion must require implementation of such actions in a timely manner dictated by the needs of salmon.

Third, the draft Biological Opinion fails to define "recovery" levels for the listed stocks. Of course, the adequacy of the proposed actions cannot be determined without first determining what is necessary to achieve "recovery," as required by the ESA. It also bears emphasis that it is "recovery" that the region's four Governors have defined as the goal, not merely avoiding extinction. The final Biological Opinion should rectify this major flaw by setting forth an aggressive schedule for defining recovery goals for each of the listed stocks and then adjusting the Biological Opinion as needed to achieve those goals.

Fourth, the draft Biological Opinion fails to provide for timely implementation of lower Snake River dam bypass should other recovery actions either not be implemented or prove inadequate. The current timeline puts off a decision on bypassing the lower Snake River dams for at least 8 years, and implementation would be closer to 15 years out. That is inconsistent with the needs of Snake River salmon. The Cumulative Risk Initiative projects that Snake River spring/summer Chinook and fall Chinook populations will be half the size they are today in less than 5 and 10 years, respectively, if current trends hold.

There is no dispute that bypassing the lower Snake River dams is the single best recovery action for Snake River stocks, and it must therefore be available if and when the fish need it. To make that possible, the final Biological Opinion must contain a firm commitment to completing all preparatory work for dam removal no later than 2005, and a requirement that the action agencies must seek immediate authorization from Congress in 2005 to bypass the dams if Snake River stocks are not firmly on the path to recovery. To do otherwise would be to ignore the best available science and greatly increase the risk of extinction for Snake River stocks.

In closing, American Rivers and the Save Our Wild Salmon Coalition are committed to working with the National Marine Fisheries Service and the other Federal agencies to remedy the deficiencies in the draft Biological Opinion before the final is issued. The necessary changes do not require new analysis or modeling, but rather can be made based on available information developed by PATH, CRI, and other credible sources and should be completed no later than the end of the year. There is absolutely no excuse for further delay. Columbia Basin salmon and steelhead need strong, effective measures now if we are to realize our collective goal of recovering healthy, harvestable stocks.

Thank you.

STATEMENT OF SARA PATTON, COALITION DIRECTOR, NW ENERGY COALITION

My name is Sara Patton and I am the Coalition Director of the NW Energy Coalition. First I want to thank Senator Crapo and Senator Boxer for holding these hearings and for allowing me to testify on this issue of paramount importance for the people, the economy and the environment of the Northwest. In November 1998, the NW Energy Coalition endorsed bypassing the four Lower Snake River dams to restore endangered salmon and steelhead on the Snake River and to replace the power from the dams with energy efficiency and clean renewable energy resources.

Second I want to describe the NW Energy Coalition to give you an idea of the breadth of our membership. The Energy Coalition has almost 100 member organizations including utilities like Snohomish County PUD and Portland General Electric, environmental groups like the Sierra Club and the Idaho Conservation League, consumer protection groups, low-income weatherization groups, good government groups, energy efficiency businesses and renewable resource developers. The Coalition has 10-member organizations in Idaho who span most of the Coalition's range from Idaho Rivers United to the League of Women Voters of Idaho to the South Central Idaho Community Action Agency to Idaho Citizens Network.

The Coalition's diverse member organizations do not share all of each other's goals and agendas. They are united in working for a clean and affordable energy future. When the Coalition Board debated endorsing bypassing the dams, the first question was, of course, whether the science calls for dam removal. Once the Board was convinced that the best scientific analysis shows that dam bypass is necessary to save these magnificent fish, they turned to the second and equally important question: whether there was enough clean and affordable energy to replace the power the four dams produce. The Coalition Board insisted that the replacement power strategies must result in no net increase in carbon dioxide emissions. The Northwest must not trade fish and wildlife restoration for air emissions, which cause local air pollution and global climate change.

My testimony will focus on the answer to that question and on the relationship of dam bypass to the current energy supply problems in the Northwest, California and the Southwest. The third question was how to mitigate any dislocation or other

difficulties that dam bypass might cause to dam dependent communities and businesses. I will not talk about the third question except to say that the Coalition Board was convinced that there are reasonable and affordable ways to mitigate that transition and the Board strongly supports funding for that mitigation.

The question of whether there is enough clean and affordable energy to replace the power from the four Lower Snake River dams was answered in the affirmative by a study entitled Going with the Flow: Replacing Energy from Four Snake River Dams. The Energy Coalition worked on the study with the primary authors from the Natural Resource Defense Council. I have appended the Preface and Executive Summary of this report to my testimony and cite you to the Natural Resources Defense Council web page for more detail (www.nrdc.org).

Going with the Flow finds that the power from the dams can be replaced with energy conservation and clean renewable energy at a cost which is equivalent to market purchases primarily from natural gas plants. Please note that the market price forecast on which Going with the Flow relied was a medium range forecast done in 1999. The recent very high market prices, overall electricity market volatility and avoided pollution make the conservation and renewable energy strategy both the most environmentally responsible and the most cost-effective power replacement option. The rate impact for residential customers of utilities which buy power from BPA for this clean energy replacement strategy would be about $1–3 per month.

Going with the Flow finds that the total power production of the four dams is approximately 1136 average megawatts or about 10 percent of the Bonneville Power Administration's power and about 5 percent of the region's power. If the dams are not removed, additional required flow augmentation would reduce the power by 196 average megawatts for a total impact of approximately 940 average megawatts. The region can replace that power with an affordable combination of clean resources: 82 percent energy conservation and 18 percent renewable energy from wind and solar generation. New gas combustion turbines are forecasted to produce electricity at 3.1¢ to 3.7¢ per kilowatt-hour. Three quarters of the energy conservation comes in at 2¢ per kilowatt-hour or less. The rest is under 3¢ per kWh.

Going with the Flow relied on the Northwest Power Planning Council's (NPPC) most recent regional conservation potential assessment. The 1998 Fourth NPPC Power Plan finds 1535 average megawatts of cost effective conservation in the region, 515 of which will probably be captured by utility acquisition programs and market response. The remaining 1020 average megawatts are all under 3¢ per kWh, but most (835 average megawatts) are under 2¢ per kWh.

This low price is important to remember since the analysis cuts off its consideration of cost-effective conservation measures at the marginal or avoided price of energy. Since the last Northwest Power Planning Council analysis was completed, the marginal price of energy, based on the price of new natural gas plants and the cost of the gas to run them, has gone up dramatically. A new analysis done by the NPPC and its Regional Technical Forum uses an avoided cost of almost 4¢ per kWh to analyze conservation potential.

Another recent Northwest Power Planning Council study analyzed the conservation potential for Seattle City Light. Seattle has had one of the most consistent and effective energy conservation programs in region and in the Nation for the last 20 years. Even with this aggressive harvest of energy conservation, the NPPC found between 180 and 260 average megawatts of energy savings available in Seattle over the next 20 years at a cost of 2¢ per kWh and below. Seattle has an average electricity load of about 1100 MW. Seattle is now making plans to double its rate of conservation acquisition in order to reap that resource at a value of $310 to $420 million to its service territory.

I want to return to the 1998 Northwest Power Planning Council analysis on which Going with the Flow relied. There are several reasons why that potential estimate was conservative at the time it was completed. First the analysis showed that if the region valued carbon emissions at between $10 and $40 per ton, another 130 to 350 average megawatts of energy conservation would be cost-effective. Second the analysis included no efficiency improvement estimates for aluminum smelters and other BPA direct service customers. More recent analysis shows a cost effective potential of between 300 and 400 average megawatts from aluminum in the Northwest. Third the potential for efficiency savings in the commercial and non-aluminum industrial sector was underestimated in the NPPC 1998 analysis. Data from the region's utilities with solid experience in delivering conservation in these sectors showed an additional 400 average megawatts of achievable conservation potential not included in the 1998 analysis.

In summary the cost-effective conservation potential derived from the 1998 Northwest Power Planning Council's Fourth Power Plan shows more than enough afford-

able conservation to replace 82 percent of the power from the four Lower Snake River dams. When one takes the conservatisms of the analysis at the time it was conducted into account (no carbon value, no estimate for increased aluminum efficiency, and underestimate of commercial and non-aluminum industrial conservation) along with the new information (higher marginal value of energy and new Seattle conservation potential forecast), it is exceedingly clear that there is plenty of cost-effective energy conservation available in the region to replace the power from these four dams.

The Going with the Flow estimate that 18 percent of the power from the four dams can be replaced with clean renewable energy generation may also be an underestimate. The Northwest has tens of thousands of megawatts of wind power potential. Currently over 350 megawatts of wind energy are proposed or being developed in Oregon and Washington alone. Smaller scale projects are underway or planned in Idaho and Montana. Idaho Power has expressed interest in purchasing the output of a small wind project near Rupert, Idaho. The price range for wind power is 4 to 6¢ per kWh. The region has about 2000 megawatts of developable geothermal potential. Currently over 60 megawatts are being developed in Oregon and northern California with power bound for the Northwest. The price range is 4.5–7¢ per kWh.

The Renewable Northwest Project estimates that the region could acquire 420 average megawatts over 10 years at a net cost of approximately $10–14 million per year over the financial life of the plants assuming 30 average megawatt projects. An additional 50 average megawatts of small scale distributed renewable energy technologies, such as solar water heaters, micro-wind turbines and photovoltaic systems for remote locations can be cost-effectively developed.

The soonest the dams can be bypassed with the speediest imaginable decision, funding and implementation process is 5 years. Five years is plenty of time in which to develop the resources to meet the need to replace the power from the dams. The draft Biological Opinion gives the region even more time to prepare for power replacement. And right now the region is embarked on intensive resource development to meet an immediate power deficit. The conservation resource is being developed by utilities like Seattle City Light, by the Bonneville Power Administration through its Conservation and Renewables Rate Discount and its Conservation Augmentation acquisition program and through new requirements in the Montana and Oregon utility restructuring statutes for investment in energy conservation and renewable energy. As noted above wind and geothermal power is being developed at a quickening pace.

At the same time the region is getting ready to develop major new gas fired generation. In the four States almost 10,000 megawatts of gas combustion turbines have been sited or proposed. In Idaho, 500 MW have been sited or proposed, and 270 MW from the Rathdrum project are expected to come on line within 1 year. In Oregon, more than 1,800 megawatts are sited or proposed, and 1,300 of those are expected to come on line within 3 years. Montana has a proposal for a 500 megawatt plant in Butte. Washington has over 7,000 megawatts sited or proposed with between 1600 and 2800 likely to be built in the next five to 10 years. Indeed, some State agency energy experts are wondering if Washington's position on the transmission and pipeline grids combined with its less stringent siting and emissions regulations may be setting it up to become an energy farm for California and the Southwest.

The NW Energy Coalition will be working to ensure that cost-effective conservation and renewables are first on regional energy resource priority lists. The Coalition will also push for strong emissions regulation and for full mitigation of carbon dioxide and other green house gases from the new natural gas plants. We hope this mitigation and the continuing good news in the development of wind, geothermal, solar, fuel cells and other clean renewable resources will make the region's dependence on natural gas as short and clean as possible. None-the-less, we definitely expect significant increases in gas generation in the near term.

The intense investment in gas, wind and geothermal plants and in conservation is most likely to produce at least a sufficiency of power to replace the contribution of the four Lower Snake dams. I have been working in electricity in the Northwest for over 20 years, and my educated guess is that the region will be in a power surplus in 5 years and the issue of power replacement will not be important in the implementation of dam bypass.

I do not mean to discount the difficulties regional electricity suppliers are facing at the moment. The NW Energy Coalition was appalled when the Bonneville Power Administration reduced spill to aid juvenile migration not once but several times this spring and summer in order to meet power shortages in California and in the region. BPA reduced spill at Bonneville Dam and at the Dalles below the minimums

of the current Biological Opinion because the region and California energy suppliers have been asleep at the wheel. They relied on a new and volatile wholesale market to provide power at low prices for more than 5 years. Northwest power suppliers could have taken a lesson from the Northeast and the Midwest which have already felt the wrath of the semi-deregulated market, but they ignored that warning. When the market spiked as markets will, it was the fish that were sacrificed to this human failure.

I will end by saying a few words about the relationship of the draft Biological Opinion to the current energy crisis. Regional energy suppliers need all the certainty they can get in their increasingly uncertain world. The draft Biological Opinion needs significant improvements, but its framework of certain timetables with certain criteria and certain consequences for failure to meet those criteria provides the kind of certainty the power suppliers need to help them manage the new dance of market prices and resource development. They will know in time, with time to spare, when and if they will need to replace the power from the four Lower Snake River dams. Significant changes need to be made in the specific timetables, criteria and consequences but the draft Biological Opinion provides a framework that can accommodate those changes.

Thank you once again for the opportunity to speak to the subcommittee and to answer questions if you have any.

STATEMENT OF NW ENERGY COALITION

PREFACE

After we conducted our analysis, the Army Corps of Engineers analyzed the impacts on electricity users of removing darns and replacing their energy through the market, as part of the environmental studies for a Snake River salmon recovery plan. Its findings on carbon impacts are virtually identical to ours. Its findings on the costs of market-based energy replacement differ, probably due to differences in two kinds of assumptions. First, our base case includes more spill and flow than provided in current hydropower operations, on the premise that such changes would be necessary to avoid salmon extinction if the dams remain in place. The Army Corps used the status quo as its base case. Second, in all our scenarios, we assume expenditures would be made in the near future to bring Federal dams into compliance with the Clean Water Act. Removing dams eliminates those costs for the retired dams. The Army Corps did not consider Clean Water Act costs in its base case.

Since we completed our analysis, changes have occurred in the energy landscape, two of which have relevance to our conclusions. First, oil and gasoline prices have jumped to record highs, offering a reminder of the volatility of fossil fuel prices. The conservation and renewable resources in our zero-carbon strategy for replacing energy from the lower Snake dams offer insurance against that kind of volatility. Our analysis indicates that when future energy prices are high, conservation and renewables would be a particularly good deal for the region. This market signal will stimulate investments, but barriers will remain that prevent all cost-effective clean energy opportunities from being fully captured. Without a commitment by government agencies and utilities, many of those resources are likely to be left untapped.

Second, the Northwest now faces a situation in which the market may not motivate the investments needed to provide sufficient energy for the region's growing needs in the coming years. An analysis by the Northwest Power Planning Council (Council) suggests that this shortfall can be addressed in an orderly fashion through a combination of market-driven and market-intervention approaches. Potential options include using real-time energy pricing that creates an economic signal to increase supply or reduce demand, using contracts or markets to reduce loads, and implementing conservation measures.

The Council believes that some market intervention would likely be needed to avoid unplanned disruptions of service, in part because the independent developers who now build power plants face considerable uncertainty about their ability to recover their costs and make a profit during this unstable period of restructuring in the electricity industry. If market intervention will be necessary even for energy development that relies on market forces, it should not be viewed as an insurmountable barrier to a clean energy strategy for replacing the generation from the lower Snake dams.

If the Bonneville Power Administration chooses to pursue energy efficiency beyond its current conservation efforts as part of a strategy for reducing the potential shortfall, as we believe it should, fewer opportunities for conservation would be available to replace energy from the Snake dams than would otherwise be the case. However,

additional sources of cost-effective conservation would be available, beyond those our study identifies for replacement of energy from the dams, to help fill that gap. As we went to press, for example, the Council was estimating significant conservation potential in the aluminum industry that we did not include in our analysis. Our study omits energy efficiency opportunities before 2001, some of which would still be available later. We have also been conservative in our estimate of industrial conservation potential and achievable renewable energy. And any supply shortage might help push energy prices higher, further increasing the amount of, and the incentives to pursue, cost-effective conservation and renewables.

One thing is certain:-the energy landscape will continue to change. Recent shifts underscore that conservation and renewable energy resources are not only superior environmentally, but are also a low-risk, versatile, and economically smart means of meeting the region's expanding energy needs,.including the need to replace energy from the lower Snake dams.

EXECUTIVE SUMMARY

Federal agencies are considering partial removal of four Federal dams on the lower Snake River as a centerpiece of a plan to rebuild endangered salmon and steelhead runs and restore a free-flowing reach of the Columbia's biggest tributary. The Columbia and Snake Rivers once formed the most productive salmon watershed in the world. Today, the Snake River's four major salmon and steelhead runs are threatened with extinction. Independent scientists have determined that a plan involving partial removal of the four dams is the best way to restore these runs to healthy, fishable levels.

Together, the dams produce about 1,136 average megawatts (aMW) of electricity, enough to supply almost 5 percent of the region's annual energy needs. Removing the earthen portions of the dams (about a third of their width) would allow the river to flow freely around the remaining concrete but render them unable to produce power.

Although deadly for fish, the dams produce electricity without generating carbon dioxide (carbon), a main cause of global warming. The Northwest Electric Power Planning and Conservation Act identifies energy conservation and non-hydropower renewables as priority resources to meet the region's electricity needs. Yet without a conscious effort to replace electricity from the dams through conservation and clean renewable resources, removing dams would result in construction of new natural-gas-fired power plants and/or increased production from existing coal- and gas-fired generators. Greater reliance on fossil fuel plants would increase emissions of carbon, nitrogen oxides and mercury from electricity production in the West.

This report analyzes the costs and carbon-emission consequences of removing the four lower Snake River dams—and replacing their energy—to restore salmon. It finds that replacing energy without increasing carbon dioxide and other emissions is affordable for residential electricity users. Our analysis shows the following:

• *Clean energy replacement is a good deal.* If future energy prices are in the medium range of projected levels, replacing power produced by the dams with clean, pollution-free alternatives would cost no more than replacing it with fossil fuel sources. If future prices are high, clean energy would be cheaper than market energy options. Market intervention would be needed to promote energy conservation and renewable energy resources.

• *The Bonneville Power Administration (BPA) system will continue to provide benefits to Northwest customers if dams are removed to restore salmon.* The cost of removing the dams and replacing their power with clean energy would increase residential electric bills by just $1 to $3 per month, assuming monthly electricity use of 1,000 kilowatt hours. BPA, which markets electricity produced by Federal hydropower dams to Northwest utilities, would still have some of the lowest electricity rates in the nation, even after paying to remove the dams and replace their energy from clean sources.

We examined the following scenarios under low, medium, and high projections for future market energy prices over a 20-year period (2001–2021):

Base case: increased flow and spill to help salmon relative to today's operations, with the Snake River dams still in place. Measures in our base case would decrease current Federal hydropower generation by 196 aMW. Our base case and other scenarios also assume that additional efforts would be made, relative to the status quo, to bring the dams into compliance with the Clean Water Act.

Market-driven power replacement: partial removal of the four lower Snake dams, with market forces directing energy replacement. Removing the four dams would decrease hydropower generation by 940 aMW compared with the base case. The market would replace the power from the dams by causing some power plants in the

western grid to run harder, and by accelerating construction of new combined-cycle gas-fired power plants. Using the AURORA electricity price forecasting model, we identified which plants would increase or decrease their operations (and associated carbon emissions) to replace lost energy and estimated by how much. We also used AURORA to estimate when new generation would be built and calculate its carbon emissions.

Allowing the market to replace 940 aMW from the dams would result in a net increase in carbon emissions of 0.7 percent between 2001 and 2021 across the Western System Coordinating Council territory, which encompasses the western United States and Canadian electrical grid (Table 3, column 7). Eighty-seven percent of the replacement generation would come from natural gas, and 13 percent from coal (Table 3, column 8). We estimate the market replacement case would increase Northwest residential electricity bills by less than $2 per month.

Zero-carbon strategy: partial removal of the four dams with an energy replacement strategy designed to produce no net increase in carbon dioxide emissions and other pollutants. Power from all four dams could be replaced affordably with energy conservation measures and renewable energy investments that would not occur without government or other direct intervention. Substantial cost-effective conservation opportunities (costing less than the market price of power and/or the cost of new power plant construction) exist, but are not being pursued. A classic example is energy-efficient buildings, which save money over their lifetimes in the form of lower energy bills, but cost more to build initially. Because builders have incentives to minimize construction costs rather than life-cycle costs, this conservation opportunity will be lost unless special incentives or building efficiency standards are in place.

The analysis shows that a package of low- and high-cost conservation, wind generation, and a very small amount of solar power could offset the carbon-emission impacts of removing dams. Because of timing issues—not all alternatives can be in place by 2004 to 2006, when dams would be removed in our scenarios—the amount of clean energy needed to ensure no net carbon increase would be greater than the amount of hydropower it would replace. Thus, our zero-carbon strategy would replace 940 aMW of hydrogeneration with 1,091 aMW of new clean resources. About 75 percent of that energy would come from low-cost conservation measures; most of the rest would come from non-hydropower renewables.

In the medium market price case, a clean energy replacement strategy would cost no more than allowing the market to replace lost generation with natural gas and coal (Table 3, column 6). When future energy prices are high, replacement with clean energy would actually be cheaper than the market-driven alternative. Only if future energy prices are low would the zero-carbon strategy be more expensive than the market case. And the clean energy strategy offers unique advantages over energy replacement through gas and coal generation, including global climate benefits, freedom from nitrogen oxides and mercury pollution, and insurance against the volatility of fossil fuel prices.

Compared to the base case, removing the four dams and replacing their energy from clean sources would add between $1 and $3 to the monthly electric bill of a residential customer fully dependent on BPA. Most residential customers would see a smaller rise because they are served by utilities that rely on BPA for only part of their electricity supply. If future energy prices are in the medium or high projected ranges, our analysis indicates that BPA energy prices would still be competitive, and the agency would continue to provide substantial benefits to its customers relative to the cost of buying power on the market. BPA will have cash-flow problems in individual years, but can solve those problems through advance planning. In all three energy price cases BPA would have generation costs among the lowest of any power marketer in the nation.

Recommendations

1. The Clinton Administration should base its salmon recovery decision on the weight of the scientific evidence, which supports partially removing the four lower Snake dams as a recovery measure. It should develop a plan to mitigate the impacts of removing dams and assist affected communities in making a smooth economic transition.

2. BPA is currently developing a resource-acquisition plan to address its existing power shortfall. With assistance from the Northwest Power Planning Council, BPA should expand that plan to include targets for acquiring conservation and renewables capable of replacing the energy generated by the Snake dams with no net increase in carbon emissions. The plan should extend beyond the current 5-year rate period to 2011. It should include:

- investing in all cost-effective conservation measures;

• investing in and/or acquiring new environmentally responsible non- hydropower renewable resources;
• developing partnerships with organizations and institutions that can leverage increased investments in new non-hydropower renewable energy resources.

3. BPA should develop and pursue a plan to avoid cash-flow problems in individual years due to removing dams and replacing their energy, using a reserve fund, borrowing mechanisms, revenue-spreading rate mechanisms, or combinations of those tools.

STATEMENT OF NORMAN M. SEMANKO, EXECUTIVE DIRECTOR AND GENERAL COUNSEL, IDAHO WATER USERS ASSOCIATION, INC.

Mr. Chairman, my name is Norm Semanko and I serve as the Executive Director and General Counsel for the Idaho Water Users Association. The Idaho Water Users Association was formed in 1938 and represents about 300 canal companies, irrigation districts, water districts, agri-business and professional organizations, municipal and public water suppliers, and others. We appreciate the opportunity to testify before you today and thank you for the invitation.

We understand the focus of this hearing to be two-fold: (1) an examination of the science upon which Federal officials are relying in writing draft salmon recovery documents for the Pacific Northwest; and (2) a determination of the extent to which the Federal Caucus of agencies has collaborated with States, tribes and interest groups while writing these draft documents. I will address each of these broad issues.

1. *The Science Reveals that Flow Augmentation is a Failed Experiment.*—Idaho water users necessarily focus their attention on the specific set of issues pertaining to flow augmentation from the Upper Snake River in Idaho. While the 12 species of salmon and steelhead that are listed under the Endangered Species Act exist only downstream of the Upper Snake River, our part of the State has been required to contribute almost half a million acre-feet of water each year toward flow augmentation during the migration season of the salmon. The National Marine Fisheries Service continues to call upon Idaho to supply this—and additional water—from U.S. Bureau of Reclamation reservoirs in the draft Biological Opinion released on July 27, 2000. This is water taken directly from reservoirs which Idaho irrigators and other water users have used and relied upon for most of the past century.

Mr. Chairman, the science is in on this issue and it clearly demonstrates that flow augmentation using water from the Upper Snake River Basin is a failed experiment. The National Marine Fisheries Service's continued reliance upon flow augmentation is without adequate scientific support and needs to be discarded from future Pacific Northwest salmon recovery efforts.

In a recent "white paper" on flow augmentation, the Federal Government's own scientists have indicated that flow augmentation does not work. Additional research on the topic by others, including the State of Idaho and our own scientists and researchers, yields the same results. This information has been well documented and provided on several occasions to the National Marines Fisheries Service and other Federal agencies involved in salmon recovery. Many examples can be provided to demonstrate how futile the flow augmentation experiment has been. Most astounding, perhaps, is the hydrologic fact that adding even increased amounts of flow augmentation to the lower Snake River would only increase the velocity of the water by one-tenth of one-mile per hour. For this vain effort, we are spending taxpayer dollars and putting our economy and way-of-life at risk. To date, this information has been ignored by political decisionmakers in the Clinton Administration who find it more expedient to continue this failed program than to discontinue it.

Idaho water users have participated in this experiment for the past 10 years, waiting for proof that flow augmentation using Idaho's precious water would provide some meaningful benefit to the salmon. We are still waiting.

To their credit, the Governors of the four Northwest States recently called upon the National Marine Fisheries Service to document the alleged benefits of flow augmentation. Draft amendments to the Northwest Power Planning Council's Fish and Wildlife Program call for the same documentation, including a determination of the precise attributes of flow augmentation that provide any meaningful benefit to the listed species. We are proud of Idaho Governor Kempthorne's leadership role in taking this first important step toward debunking the myth that flow augmentation using Idaho irrigation water can somehow save the fish. We know that it cannot.

Mr. Chairman, we will be providing detailed comments to the National Marines Fisheries Service regarding both the draft Biological Opinion and the draft Basinwide Salmon Recovery Strategy. We plan to provide a copy of those comments

to your subcommittee. In preparing those comments, we have been able to draw the following conclusions based on the science that currently exists:

1. Flow alteration from the Upper Snake River Bureau of Reclamation projects, and operation and maintenance of these projects, has not caused jeopardy to the listed species or resulted in any direct or incidental take of the species;
2. Unnecessary and repetitive consultations have been held regarding the Upper Snake River projects;
3. The flow-survival hypothesis used in the draft Biological Opinion is unfounded;
4. The flow targets which have been set in the Lower Snake and Columbia Rivers are unreasonable, unfounded and, in most cases, unachievable;
5. Flow augmentation using Idaho water has not aided in conservation or recovery of the listed species and may actually be harming the fish;
6. Continuation of the flow augmentation program at current or increased levels threatens to dry up hundreds of thousands of acres of Idaho farmland and cost thousands of agricultural jobs; and
7. Other measures exist which, if adopted and implemented, would provide a more certain benefit for the listed species.

A few of these points deserve additional discussion and illustration.

Flows from the Upper Snake River have slightly increased over the past 85 years, especially during the critical summer months, despite irrigation development in southern Idaho and the construction of the Upper Snake Bureau of Reclamation projects. The scientific documentation for these conclusions is summarized in Figures 1 through 6, which are included in my prepared statement. This development and construction occurred long before the populations of the listed species declined to endangered or threatened levels. Thus, development in the Upper Snake did not alter flows resulting in jeopardy to the listed species or adverse effects on their habitat.

There is no scientific foundation for conclusions in the Draft BiOp that Upper Snake flow augmentation will provide biological benefits for the listed species. The purported flow survival relationship for fall chinook above Lower Granite is unfounded and there is evidence that flow augmentation from the Upper Snake BOR projects is actually detrimental to the fish, particularly because of the temperature of the water provided from the Upper Snake River. Likewise, there are no demonstrated benefits from flow augmentation through the hydropower system, in the estuary, or in the ocean plume for any of the listed species. The relatively miniscule contribution that flow augmentation makes toward the overall flow of the Snake and Columbia Rivers is documented in Figure 7 of my prepared statement.

Flow augmentation from the Upper Snake has previously been an interim or experimental measure aimed at mitigating the jeopardy and incidental take caused by the FRCPS. There is no basis for the new conclusion in the Draft BiOp that the Upper Snake BOR projects cause jeopardy, with or without providing 427 kaf of flow augmentation. Likewise, there is no basis for the implication in the Draft BiOp that the Upper Snake BOR projects incidentally take listed species.

Because operation of the Upper Snake BOR projects does not cause jeopardy, there is no basis for the reasonable and prudent alternatives (RPAs) for these projects identified in the Draft BiOp. Specifically, the flow targets established for the mainstem are unreasonable and unfounded. Flow augmentation using 427 kaf of more water is unnecessary and illegal, especially with respect to the use of powerhead space to firm supplies. The requirement for the BOR to consult on uncontracted space does not fully comport with Federal and State law and the proposed consultations are too narrow. Pursuit of increased water conservation and reduction of so-called unauthorized uses in the Upper Snake will not increase streamflow. Finally, additional water should not be sought from the Upper Snake. The additional water is not needed, and a State law mechanism for providing that water downstream is unlikely.

In its own consultations, the U.S. Fish and Wildlife Service recognized that the Upper Snake River projects were recently consulted on, culminating in a biological opinion during 1999. Since nothing has change in the Bureau or Reclamation's operations, the Fish and Wildlife Service determined that additional consultation on the Upper Snake projects is not required. As a result, the Upper Snake projects are not included in the Service's draft 2000 biological opinion. Given the time and effort put into the previous consultation, this is the only approach that makes practical and legal sense. For reasons inexplicable to us, the National Marine Fisheries Service has not followed the U.S. Fish and Wildlife Service's lead. Although the NMFS BiOp on the Upper Snake projects was completed just last December, the agency chose to include a reexamination of the projects in the 2000 BiOp, despite the fact that there has been no change in the proposed operations. This repetitive consultation is uncalled for.

Harvest reforms can provide significant benefit to the listed species, especially Snake River fall chinook. The RPAs listed for harvest in the Draft BiOp should be revised to require these reforms.

In summary, the Idaho Water Users Association opposes the inclusion of flow augmentation using 427,000 acre-feet or more water from the Upper Snake River as an RPA. There is no basis for these measures and the Draft BiOp should be revised to eliminate Upper Snake River flow augmentation because these BOR projects do not jeopardize the listed species or adversely modify their habitat. Moreover, flow augmentation does not provide significant biological or physical benefits to the listed species.

Mr. Chairman, by presenting this information, I hope that we have given you some idea of the degree to which the science used by the Federal agencies fails to support the conclusions regarding flow augmentation in the draft salmon recovery documents. We would appreciate anything that you and the subcommittee can do to bring this matter to the attention of the Federal agencies.

2. *The Federal Caucus has Failed to Meaningfully Collaborate on its Draft Salmon Recovery Documents.*—From our perspective, the Federal agencies involved in salmon recovery—particularly the National Marine Fisheries Service—have failed to collaborate with interest groups such as ours in drafting these important documents. In fact, we have taken virtually every opportunity to provide detailed, written comments to NMFS on draft documents and analyses. To date, our concerns have been ignored. In some cases, they have not been acknowledged at all.

Mr. Chairman, if the goal is to develop a regional plan by consensus, the Federal agencies have failed miserably. Anything that this subcommittee can do to correct this situation would be greatly appreciated.

Thank you again for the opportunity to testify today. I am glad to answer any questions or provide any additional information to the subcommittee.

Figure 1.

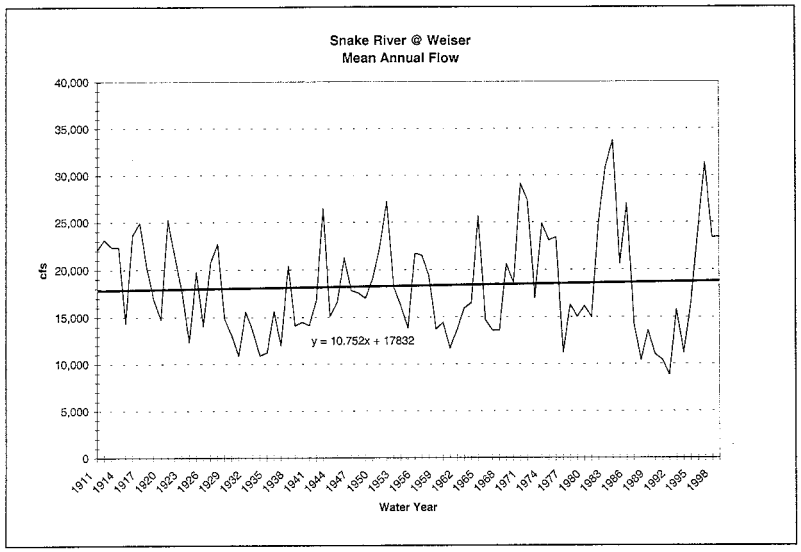


Figure 2.

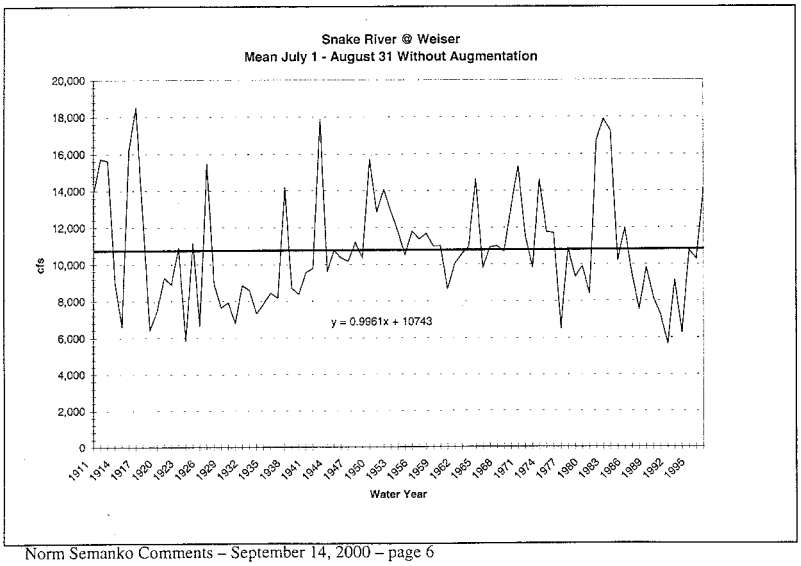


Figure 3.

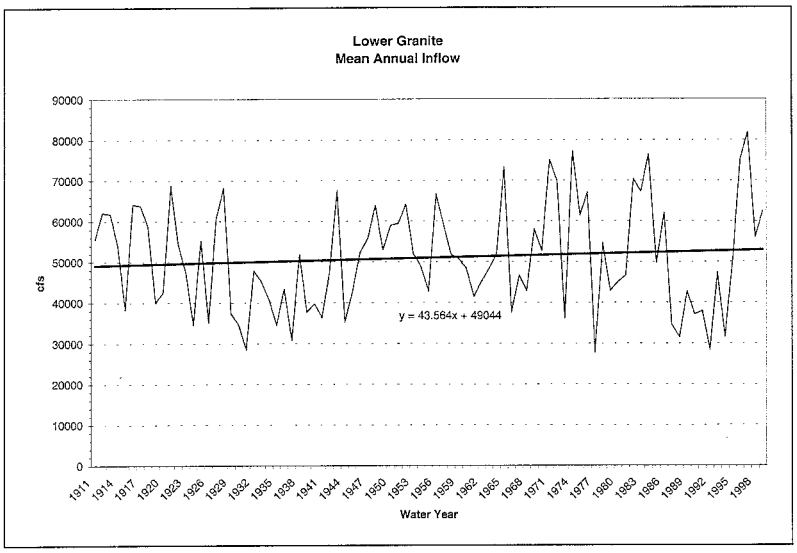
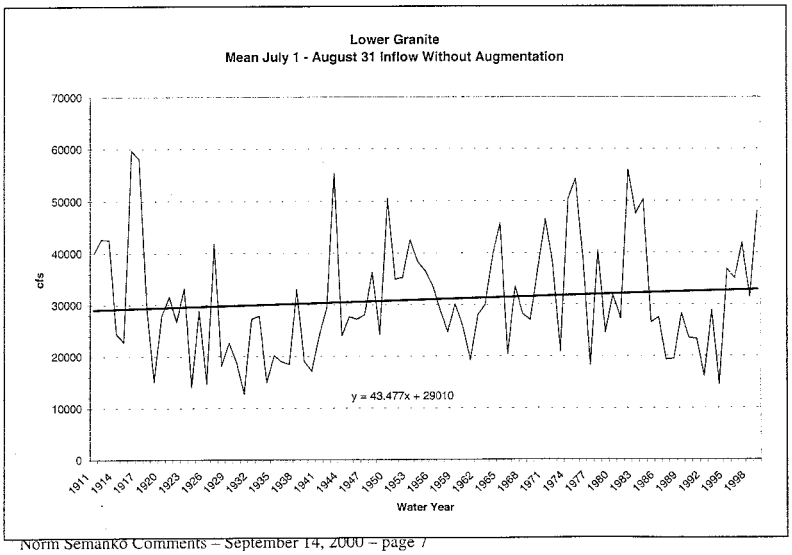


Figure 4.



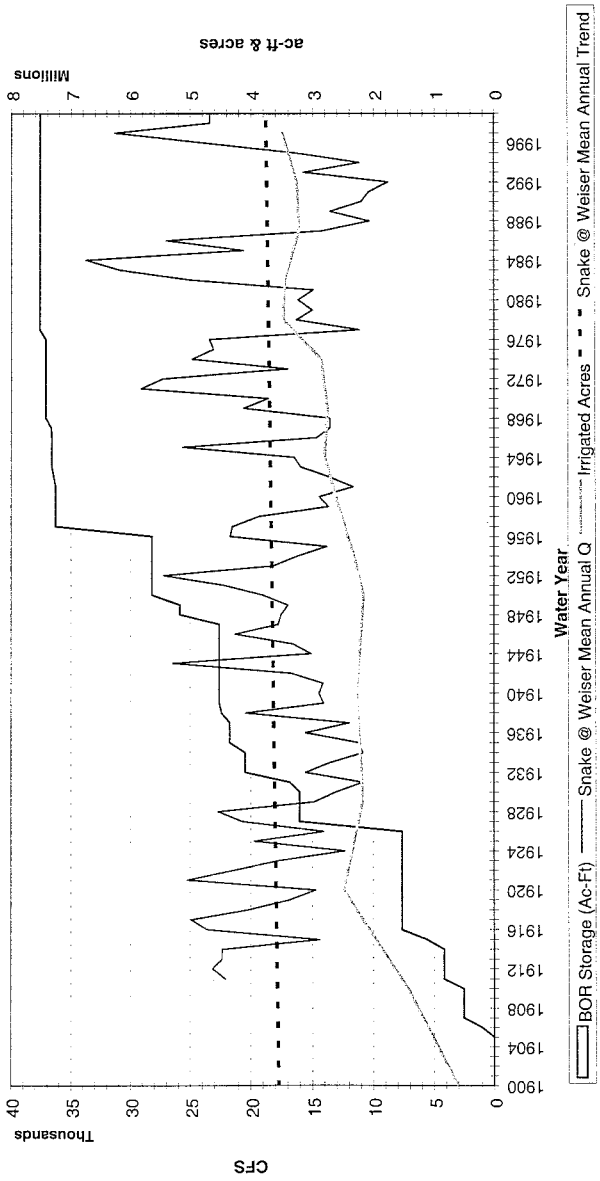
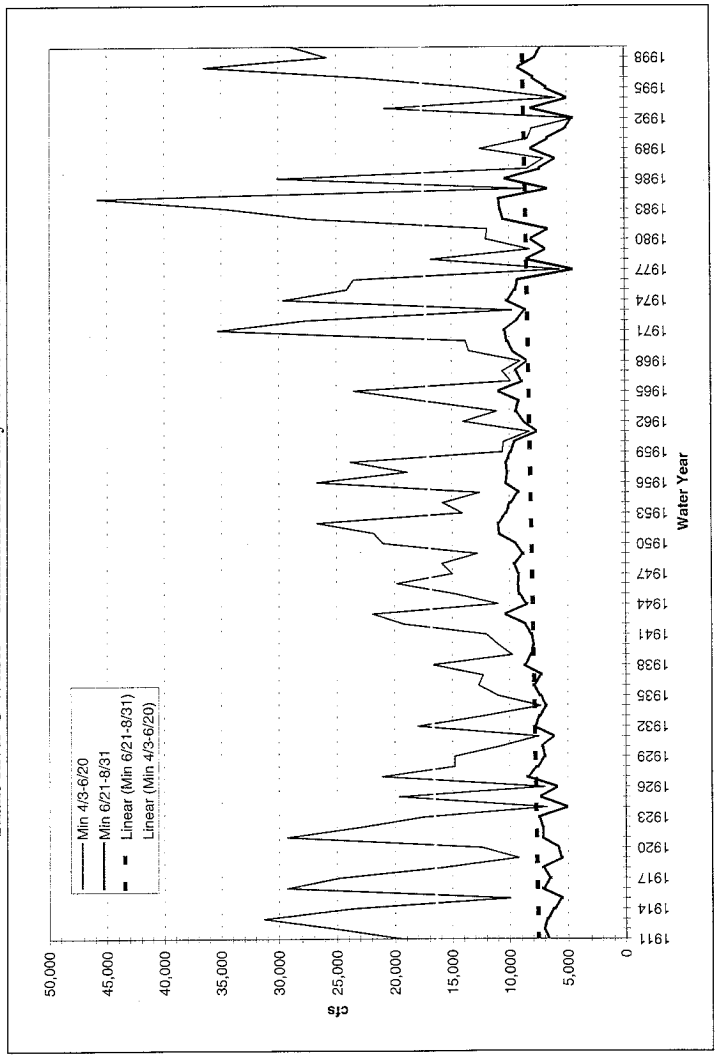


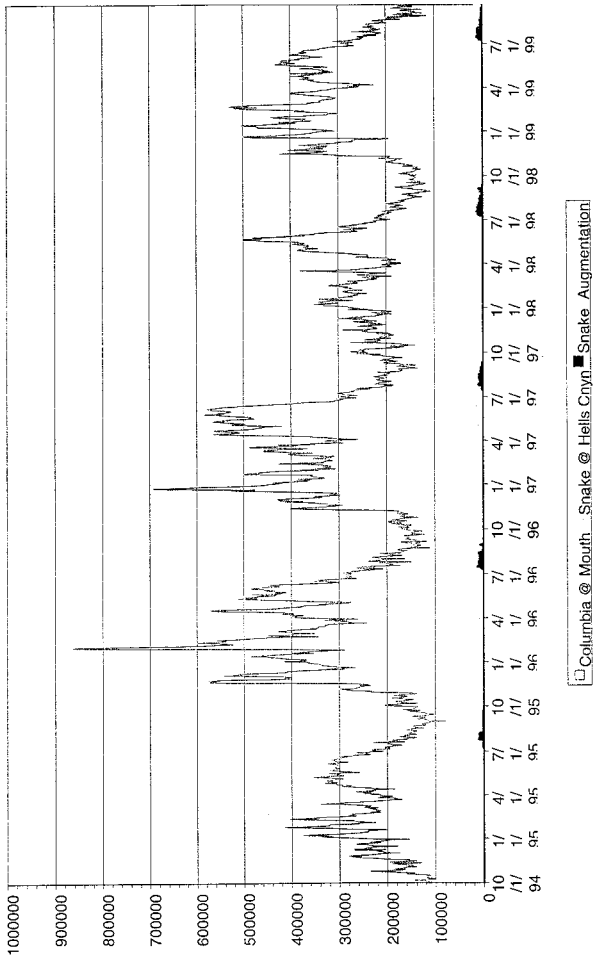
Figure 5. Snake River @ Weiser Mean Annual Flow, Irrigated Acres and Reclamation Storage.

Figure 6.
Snake River @ Weiser — Minimum Mean Daily Flow for Periods Shown.



Norm Semanko Comments – September 14, 2000 – page 9

Figure 7.
Snake River Flow Augmentation Compared to the Columbia River at the Mouth And the Snake River at Hells Canyon -- 1995 - 1999



Norm Semanko Comments – September 14, 2000 – page 10

September 25, 2000.

Federal Caucus,
C/O Jenifer Miller,
BPA–P–6,
905 NE 11th Avenue,
Portland, OR.

Re: July 27, 2000 Draft Basin-Wide Salmon Recovery Strategy

DEAR MS. MILLER: Enclosed are comments on the draft Basin-Wide Salmon Recovery Strategy submitted on behalf of a large number of Idaho water users. We encourage the Federal Caucus to remove flow augmentation from the Upper Snake River in southern Idaho from its recovery strategy. Flow augmentation from southern Idaho was begun as an interim experimental measure that has not been shown to be an effective use of water resources or money for salmon recovery.

We appreciate this opportunity to provide comments to the Federal Caucus on the draft Basin-Wide Salmon Recovery Strategy.

Respectfully submitted by,

JOHN K. SIMPSON,
Roshon, Robertson & Tucker.

NORMAN M. SEMANKO,
Executive Director & General Counsel.

FEDERAL CAUCUS—COMMENTS BY IDAHO WATER USERS ON CONSERVATION OF COLUMBIA BASIN FISH DRAFT BASIN-WIDE SALMON RECOVERY STRATEGY

These comments are submitted on behalf of the Committee of Nine and the Idaho Water Users Association (hereinafter "Idaho water users"). The Committee of Nine is the official advisory committee for Water District 1, the largest water district in the State of Idaho. Water District 1 is responsible for the distribution of water among appropriators within the water district from the natural flow of the Snake River and storage from U.S. Bureau of Reclamation reservoirs on the Snake River above Milner Dam. The Committee of Nine is also a designated rental pool committee that has facilitated the rental of stored water to the Bureau of Reclamation to provide water for flow augmentation pursuant to the 1995 Biological Opinion. The Idaho Water Users Association was formed in 1938 and represents about 300 canal companies, irrigation districts, water districts, agri-business and professional organizations, municipal and public water suppliers, and others. These comments have been prepared with the assistance of the scientists, biologists, and engineers who have been retained to address Snake River ESA issues.[1]

SYNOPSIS OF COMMENTS

Idaho water users support salmon recovery. Idaho water users are, however, becoming increasingly frustrated by the lack of response to legitimate scientific concerns raised in their numerous comments to draft salmon recovery documents and proposals.

This Draft Basin-Wide Salmon Recovery Strategy (Draft Strategy) once again demands release of water from the Upper Snake River[2] for flow augmentation in the name of salmon recovery, yet the benefit of flow augmentation has never been documented. Further, even though flow targets and flow augmentation were required by the 1995 Biological Opinion and are the first items under Improving Water Management in this draft, the Research, Monitoring and Evaluation portion of this draft does not even mention how the alleged benefit of flow targets and flow augmentation will be monitored or evaluated.

Development of water resources in the Upper Snake River basin did not cause the decline of fish populations and has not resulted in the destruction or adverse modification of critical habitat. Reducing Upper Snake River water uses to provide flow

---

[1] Contributors include: Dr. James J. Anderson, School of Fisheries, University of Washington; Craig L. Sommers and David B. Shaw, ERO Resources Corporation; Dr. Richard A. Hinrichsen, Hinrichsen Environmental Services; Dr. William J. McNeil, retired professor of fisheries, Oregon State University. These individuals also contributed to comments by the Idaho water users on the draft White Paper on flow (10/29/99), the draft All-H Paper (3/16/00) and the draft Feasibility Report/Environmental Impact Statement (3/31/00). Résumés of the contributors are provided in Attachment 3.

[2] Throughout these comments, the Upper Snake River means the portion of the basin above Brownlee Reservoir.

augmentation will not reverse the fish population decline, recover the populations, or mitigate the adverse modification of critical habitat caused by activities in the lower Snake and Columbia Rivers. Continued calls for ever-increasing amounts of water from southern Idaho ignore the fact that there is no significant biological benefit from an option that has enormous economic and social costs.

In the March 16, 2000 comments to the Draft All-H Paper, Idaho water users agreed with the overall scope and purpose of the paper. However, Idaho water users did not then and do *not* now agree with the inclusion of existing or additional levels of flow augmentation in the conceptual recovery plan. The concerns of the Idaho water users, the same water users who provide much of the storage water to the Bureau of Reclamation for flow augmentation, were not even acknowledged in the Public Comments in the new draft report. Upper Snake River flow augmentation is not a necessary or viable component of a conceptual recovery plan because it fails to meet the goals and objectives spelled out in the All-H Paper and it does not reflect and balance the realities of the region, i.e.:

- Flow augmentation does not provide significant biological or physical benefits;
- Flow augmentation has high economic cost and impact; and
- Flow augmentation must overcome huge political and legal hurdles.

The Upper Snake River basin has supplied over 3.5 million acre-feet (MAF) of water for flow augmentation over the past 10 years. Another 15 MAF have been provided from Brownlee and Dworshak Reservoirs. In spite of the enormous volume of water that has been released for flow augmentation, there is no evidence that this added water has contributed to the survival of Snake River spring and summer chinook, steelhead, or sockeye populations or will promote their recovery. Studies of fall chinook survival above Lower Granite Reservoir show a relationship to migration timing, temperature, turbidity, flow, and travel time (in that order), but the relationship between flow and adult survival is not statistically or biologically significant.

The existing level of flow augmentation from the Upper Snake River (427,000 AF/yr) should be discontinued since it provides no significant benefit to listed.species or their habitat and impacts will occur on water users and local resources in dry years. Likewise, an aggressive program of additional flow augmentation, such as Hydropower Option 2 (taking up to another 1 MAF out of the Upper Snake River), will bring renewed opposition from Idaho water users. Such a program will have devastating impacts on southern Idaho by drying up more than 600,000 acres of productive farmland, costing over $430 M per year, causing thousands of lost jobs, and severely impacting local fisheries, wildlife habitat, recreation, and the cultural and historical resources of the Upper Snake River (USBR, 1999).

In summary, Upper Snake River flow augmentation should be eliminated from consideration as part of this recovery plan. Idaho water users conceded to a trial period during which any benefit of Upper Snake River flow augmentation could be demonstrated. The trial period has ended and no recovery benefit has been demonstrated.

Our comments on the Draft Biological Opinion issued by NMFS are attached to these comments. The attachment is incorporated by this reference as though set forth in full herein.

GENERAL COMMENTS

The Idaho water users reiterate their comments of March 16, 2000. The primary concern of the Idaho water users expressed in the March 16 comments and today is the continued call for augmentation water from the Upper Snake River to attempt to meet flow targets at Lower Granite Dam. Idaho water users initially agreed to the flow augmentation experiment conditioned upon the development of data to show the effects of augmentation on survival of the listed species. However, the data that has been developed does not support the continuation of flow augmentation from the Upper Snake River.

The attached comments of the Idaho water users on the Draft Biological Opinion issued by NMFS present additional data and analysis to support discontinuing flow augmentation from the Upper Snake River. The available data does not show the mean annual discharge from the Upper Snake River has decreased over time, even with the development of Bureau of Reclamation projects in that portion of the basin. Neither does available data show augmented flow from the Upper Snake River will lead to recovery of the listed species. Finally, changes to the hydrograph of the Columbia River at the estuary are primarily the result of operation of the FCRPS on the mainstem of the Columbia and the magnitude of those changes is such that trying to "normalize" the hydrograph with Upper Snake River flow augmentation is simply futile.

CONCEPTUAL RECOVERY PLAN, GOALS

Idaho water users generally agree with the need for a conceptual recovery plan to address the recovery of listed species impacted by the FCRPS[3]. It is not apparent, however, what role the Draft Basin-Wide Salmon Recovery Strategy will have nor how the goals will be pursued since the Implementation chapter has not been provided.

The Program Goals are different in the Executive Summary (p. 4) and in the body of the report (p. 38). Specifically, in the body of the report, one of the goals states:

> Balance the Needs of Other Species. Ensure that salmon and steelhead conservation measures are balanced with the needs of other native fish and wildlife species.

Idaho water users agree with this goal but in the Executive Summary the following language has been added at the end after "species": "and do not unduly impact upriver interests. " It is not clear, due to the differences in the goal at different locations, which goal will be followed. As "upriver interests," the Idaho water users, of course, do not want to be "unduly impacted." In fact, the Idaho water users should not be impacted at all because their activities have not caused the species to be listed and there is no evidence that Upper Snake River flow augmentation has resulted in demonstrable benefits to the listed species.

The Idaho water users also believe the goal to "Minimize Adverse Effects on Humans" is critically important. The water users believe a balance must and can be achieved that will recover the species but not destroy the social and economic structure of the region.

HYDROPOWER OPTION 2

The Federal Caucus recommends Hydropower Option 2 for Snake River Operational Measures, which includes additional water for temperature control and flow augmentation. As thoroughly discussed in the attached comments to the NMFS Draft Bi-Op, augmentation water from the Upper Snake River has not been shown to be beneficial for recovery of the listed species. Flow augmentation from the Upper Snake River may, in fact, increase downstream water temperatures that could be detrimental to listed species.

As stated repeatedly in these and prior comments, the Idaho water users do not believe the science supports taking additional Upper Snake River water for flow augmentation or temperature control.

RESEARCH, MONITORING AND EVALUATION

Although the Idaho water users strenuously oppose the use of water from the Upper Snake River for flow augmentation, if any amount of this augmentation is continued, it must be monitored and evaluated. The research, monitoring and evaluation portion of the Draft Strategy omits any attempt to quantify benefits from flow augmentation. Even though the first measure identified in the hydropower element of the strategy is "water management . . . to meet salmon flow objectives, (Vol. 2, p. 71) the section on proposed monitoring and evaluation is silent on determining the benefit of the flow objectives to the listed species survival and recovery.

The Draft Strategy states ". . . we will continue following cohorts through their down-river migration to early ocean juvenile stages . . ." (Vol. 2, p. 95) but does not give any indication of a planned measurement of flow augmentation benefits. The benefits of the flow objectives on the listed species must be evaluated, yet the Draft Strategy simply proposes to determine if the flow objectives have been implemented. Implementing actions without assessing their consequences not only ignores the requirement to apply the best available science to recover the species but also is irresponsible.

PUBLIC COMMENTS

The Idaho water users submitted extensive written comments on the draft All-H paper as noted above. Those comments are more broadly based than captured by Issues 02–006, 02–013, 08–001, and 10–005 in the Draft Strategy. Research conducted for the water users cannot find any scientific basis for the Lower Granite flow targets, the impetus for flow augmentation from the Upper Snake River. In fact, analysis of available data shows water from the Upper Snake River may ad-

[3] FCRPS in this document refers to the Federal Columbia River Power System and does not include the Bureau of Reclamation facilities upstream from Lower Granite Dam.

versely impact temperatures at Lower Granite Dam and that discharge from the Upper Snake River has not diminished over time.

The issue of Lower Granite flow targets and Upper Snake River flow augmentation is a critical issue with the Idaho water users, those same water users that have made water available for rent by the Bureau of Reclamation to provide flow augmentation under the current Bi-Op. The full range of legitimate questions raised by the Idaho water users in their March 16, 2000 comments must be addressed and the flow targets must be justified for there to be a basis for any further flow augmentation experimentation.

STATEMENT OF GLEN SPAIN, PACIFIC COAST FEDERATION OF FISHERMEN'S ASSOCIATIONS (PCFFA)

My name is Glen Spain. I am the Northwest Regional Director of the Pacific Coast Federation of Fishermen's Associations (PCFFA), the west coast's largest organization of commercial fishermen and fishing families, which represents the interests of thousands of small and mid-sized family owned commercial fishing operations working in ports from San Diego to Alaska. We are also America's oldest industry. Our members provide this country with one of its most important and highest quality food resources as well as a major source of exports. Our efforts provide tens of thousands of jobs in coastal communities supported by the bounty of the sea. PCFFA is a federation of 25 different port and small to mid-sized vessel owners' organizations coastwide, representing a combined vessel asset investment in excess of $1 billion.[1]

Thank you for the opportunity to testify on this very important issue of salmon restoration in the Columbia Basin—a subject that means life or death to many west coast fishing-dependent communities. The mainstay of our industry has always been Pacific salmon—until recent salmon declines, particularly in the Columbia, have made that impossible. Decades of serious declines in salmon runs from the Columbia, once the most productive salmon river system in the world, have dramatically affected the commercial fishing-dependent economies of California, Oregon, Washington and Alaska as well as devastated the recreational fishing economy of Idaho. The current Biological Opinion (BiOp) under consideration by this committee is the latest and most important effort to reverse those declines and help restore our industry.

Fishermen are family food providers, but in order to be able to produce high quality seafood and maintain tens of thousands of jobs in coastal communities, we must have something to catch! Most of our people are now, or have been, salmon fishermen. However, every year for decades now there have been fewer and fewer fish coming out of damaged west coast watersheds. Widespread habitat loss and the destruction wrought by the multitude of west coast dams, many no longer cost effective or even needed, has now pushed many once abundant wild salmon runs to such low numbers that NMFS has *had to put 25 separate and distinct runs of Pacific salmon and steelhead on the Federal Endangered Species list.*[2] Twelve of those listed runs—among them runs historically among the most important to the existence of a west coast commercial salmon fishing industry—are now in the Columbia Basin.

COLUMBIA RIVER DECLINES HAVE DEVASTATED THE WEST COAST FISHING INDUSTRY

Once the most productive salmon-producing river system in the world, wild salmon runs in the Columbia Basin are now at less than 2 percent of their historical run size. As we speak, nearly every salmon run in the Columbia River has been listed under the Endangered Species Act. However, the current depressed status quo does not come cheaply. Salmon mean business. Fewer salmon mean fewer jobs, less cash-flow and fewer tax dollars to every coastal and many inland communities. Salmon declines have cost money—a lot of money—in the form of lost economic opportunities, shrinking tax bases and lost jobs.

In fact, the mismanagement of the Columbia and Snake River Federal Hydropower System that has plunged these runs toward extinction has cost the regional economy at least 25,000 fishing-dependent family wage jobs, and drained more than $500 million/annually from the west coast economy in the form of lost economic op-

---

[1] A list of PCFFA member organizations is included as Attachment A.

[2] For the current status of salmonid listing decisions on the west coast, see the National Marine Fisheries Service web site: http://www.nwr.noaa.gov/1salmon/salmesa/pubs/1pg300.pdf For online maps of the many many ESUs now listed see: http://www.nwr.noaa.gov/1salmon/salmesa/mapswitc.htm. For general information on the listings, see: http://www.nwr.noaa.gov/1salmon/salmesa/specprof.htm.

portunities.[3] At least a fifth of these losses 5,000 jobs and $100 million/year are directly attributable to declines in the Snake River which in turn are clearly linked to high salmon mortalities caused by the lower Snake River dams (Ice Harbor, Lower Monumental, Little Goose and Lower Granite Dams), a system of four dams completed in 1975. Once booming downriver fishing ports such as the Port of Astoria are now in serious economic decline. In recent years, since Snake River chinook and sockeye can migrate widely both north and south, the Pacific Fisheries Management Council (PFMC) has had to impose salmon fishing restrictions to avoid their accidental bycatch all the way to Central California and well up into Southeast Alaska at a cost to these ports of many tens of millions of dollars annually in lost harvest opportunities.[4] Columbia River stocks are thus 'key stocks' in the whole west coast salmon fishery management. In other words, even though there may be *millions* of healthy wild and hatchery-produced fish out there in the ocean, our people are foreclosed from catching them for fear of even *accidentally* impacting these weakest (and now ESA listed) stocks. The Columbia salmon are also the key to meeting the U.S. allocation commitments to the Pacific Salmon Treaty with Canada, and past Columbia declines lead directly to the Treaty's collapse in years past.

The positive side of all this is that the economic return on your investment in Columbia and Snake River salmon restoration efforts, if done properly, will be very large. *And I want to emphasize that salmon restoration efforts in the Columbia are an investment, not a cost.* If properly done, much of the $500 million/year now lost to the regional economy because of salmon declines could be recaptured in perpetuity as part of a sustainable west coast fishing industry. Our priority—as a major economic interest in the Columbia Basin as well as in the coastal economies of California and Alaska—is in restoring the salmon, and in so doing restoring the lower river and coast economies that depends upon those salmon. If the best available science says that this means that some of the Lower Snake River dams must be decommissioned, then we support those measures and will work with upper river users to mitigate and manage these changes. However, if Columbia River salmon recovery can truly be accomplished *without* decommissioning the lower Snake River dams, obviously this would be far better as well as far more politically feasible.

IMPORTANCE OF COMPLETING THE COLUMBIA RIVER BIOLOGICAL OPINION (BIOP)

In general, we support the Administration's current BiOp approach: "Let's really try whatever we can do *right now* to offset and mitigate for losses in the dams, including major efforts to improve flow and restore critical estuary and tributary habitat, and carefully monitor the results to see if we can achieve recovery short of decommissioning Snake River dams." In other words, this BiOp sets up a test of the easiest to achieve options first. We believe that this is by and large a sound and rational strategy.

However, if that effort *does not work*, other necessary measures must then be taken, up to and including selective dam decommissioning in the Snake River. In the meantime, on the possibility that these non-dam measures may not work, we must also plan for that alternative just as a matter of insurance. Otherwise we are committing all our eggs to a single basket which may not hold them. If the BiOp Plan fails, and we do not make what would then be the only other possible decision, the only other alternative would be to plunge the whole Northwest hydrosystem, and the whole region, into political and economic chaos.

The importance of completing this Biological Opinion on the operation of the Columbia River Power System (now out for public comment) as soon as possible cannot be overstated. The whole Columbia Federal hydrosystem teeters on the verge of chaos. The States have shown themselves incapable of coming to any lasting consensus on the management of the system (through the Northwest Power Planning Council or otherwise) and the Federal Government is now faced with serious and pervasive ESA conflicts, Clean Water Act conflicts, and potential litigation by Treaty

[3] Economic figures on salmon losses from the Cost of Doing Nothing: The Economic Burden of Salmon Declines in the Columbia River Basin (October, 1996), Institute for Fisheries Resources, available from IFR at P.O. Box 11170, Eugene, OR 97440–3370.

[4] Ocean and Columbia estuary salmon season closures have also been independent of the ESA, and are required under 'weak stock management' principles by the Magnuson Act. Major coastal salmon closures started almost two decades before even the first salmon ESA listing as necessary conservation measures to protect weak stocks that are in serious decline. Thus even without the ESA, many portions of our coastal fisheries would remain closed simply because there are too few fish surviving their in river migration through the dams.

Tribes for the abrogation of their treaties.[5] Postponing decisions will not make them cheaper, it will make them much more difficult to achieve and therefore much more expensive.

In addition there are continuing calls for the Federal Government to divest itself entirely of the Bonneville Power Administration (BPA) by taxpayer watchdog groups and congressional budget hawks outraged by the massive and pervasive Federal subsidies that are now propping up the system, and those arguments will only be proven correct if BPA and the region continue to be unable to solve these problems. These problems are not getting any easier either as time goes by.

THE BIOLOGICAL OPINION FRAMEWORK IS WORKABLE

Though it has serious flaws (as outlined below), and the BiOp is clearly a first draft, the overall framework of the Biological Opinion is, we believe, the correct one. In fact, there are twelve (12) major salmonid ESU's within the basin with declines that must be reversed, only four (4) of which are in the Snake River. Though most of the controversy has revolved around the Snake River, obviously breaching the Snake River dams alone will do little to help the other eight (8) runs. The BiOp recognizes that something more needs to be done to benefit all the runs.

Many of the measures (such as increased flow augmentation and estuary habitat protection and restoration) are clearly going to benefit not only the most seriously depressed runs in the Snake River, but all the other runs as well. *Many of these measures are necessary to salmon restoration.* What remains to be seen is whether these measures, alone, will be sufficient for actual recovery, and if so for which of the twelve (12) listed runs? In order to ascertain whether these measures work, the BiOp requires: (1) specific performance standards and specific measures to be taken; (2) a clear and ongoing monitoring mechanism to see whether performance standards are in fact being met and take appropriate actions if they are not. The BiOp clearly is designed to provide both, though details are so far sketchy.

However, in addition, there are consequences for inability to meet performance standards. *This includes the failure of Congress to fund the required measures.* This BiOp is the only scientifically and legally viable plan available to avoid the necessity of decommissioning the lower Snake River dams. *Without congressional support particularly full funding so that all its measures can be implemented in a timely way this Biological Opinion will fail, and Snake River dam decommissioning will then be left as the only available option.* Failing to act would plunge the region into political and economic chaos. The status quo is not working, so doing nothing is also not an option.

However, this Plan must be taken and funded as a whole. The BiOp is like a fine tapestry removing the warp from the woof will yield nothing but an unconnected pile of threads. Efforts by certain Members of Congress to 'cherry pick' what provisions of the whole plan they wish to implement will inevitably crash the plan.

THE FLAWS IN THE BIOLOGICAL OPINION THAT NEED TO BE FIXED

That said, there are still a number of serious systemic flaws in the Biological Opinion that need to be fixed if it is to constitute a valid recovery effort. These flaws include:

(1) *Lack of Specific Performance Standards.*—The agencies admittedly are still developing both biological and implementation performance standards by which to assess whether the plan is working or not. Obviously there must be ascertainable recovery targets in the BiOp. Many of these performance standards still need to be worked out, and the lack of any detail on most of those standards is a serious problem in the current Draft. The Administration admits this problem and is attempting to develop specific performance standards at this time.

(2) *Lack of Detailed Measures.*—Again, lack of detail in terms of what specific measures will be required makes it difficult to assess precisely what actions will be done under the BiOp, who is going to perform them or to weigh their likely effectiveness. Again, these details must be filled in before the BiOp constitutes a legitimate recovery pathway.

(3) *Lack of Cost Estimates of Measures.*—Obviously, if it cannot be ascertained what the recovery targets are nor what specific measures must be undertaken to achieve them, then it becomes impossible to estimate either the costs of the measures or their economic impacts on other industrial sectors such as ours. It also becomes impossible to accurately weigh those costs against the known costs of Snake

[5] Tribal Treaty claims would be liabilities directly by the U.S. Treasury, affecting taxpayers in every state. Minimum damages for abrogation of those treaties have been estimated at $10 billion, and such cases are routinely upheld in the U.S. Supreme Court.

dam decommissioning, or against the enormous ongoing costs to the economy of the current failed status quo. Clearly we need to know as soon as feasible just how much these non-breach options will cumulatively cost as the alternative.

(4) *Check-ins Too Infrequent or Too Late.*—Currently the BiOp contains only year five (5) and year eight (8) check-ins to see how the plan is being implemented and whether it is effective. These check-ins need to be annually, with a major 'decision-point' check-in at year three (3). By year three (3), we will know whether the required recovery measures are being scheduled and funded by Congress. By year three (3) we will know pretty well whether the Plan is going to even be implemented. There will also likely have to be occasional changes to the BiOp as we implement adaptive monitoring. Long check-in timeframes work directly against flexibility and efficient implementation and will likely cost us all a lot more in the long run. Annual report cards avoid this problem.

(5) *Lack of 'Hard-wired' Decision Points.*—At some point, if this Plan fails, there will have to be some very serious decisions made. This Plan is, frankly, the best and likely the *only* option for recovery short of decommissioning at least some dams (those in the lower four Snake River). Biological or political failure of this 'in-lieu of breaching' strategy would leave no choices remaining but to decommission some or all of the Snake River dams. This should be acknowledged up front. The laws of nature are very unyielding, and the options available are becoming increasingly limited not by policy considerations, but by basic rules of hydrology, biology and physics.

IT'S TIME TO PUT UP OR SHUT UP

The Northwest ratepayers and Federal taxpayers have already expended more than $4 billion on Columbia River salmon recovery efforts, relying for three decades very heavily on artificial salmon collection and barging and trucking programs which were never thoroughly tested and which clearly have not worked. The BiOp also relies much too heavily on those failed programs, but also includes habitat and estuary restoration, hatchery reforms and fish passage modifications that are all long overdue, and likely will benefit not only the Snake River runs but all twelve (12) listed subspecies. While we (as do most scientists) remain highly skeptical about whether all the measures in the BiOp combined will, in and of themselves, be enough to offset the up to 88 percent mortality inflicted by the whole gamut of dams culminating in the Snake River dams, we believe there is good logic in giving it the best possible try to see if we can achieve recovery.

A number of political leaders have stated that they believe that all other feasible measures throughout the whole system should be tried before resorting to decommissioning Snake River dams. Both politically and administratively this makes sense. However, we believe the time is now here for opponents of dam decommissioning generally to 'put up or shut up.' The Biological Opinion now on the table is their only viable alternative to dam decommissioning.

Legally the BiOp is a 'jeopardy' finding, subject to an integrated set of mandatory mitigation and recovery measures which, if implemented, may *overcome* jeopardy. Any effort by Members of Congress to 'cherry pick' only the elements they like or to eliminate funding for options they may not like (through the appropriations process or otherwise) creates the *huge risk that the BiOp as a whole will fail.* Failure would inevitably lead once again into chaos, a huge potential Treasury liability and probable takeover of the whole system by the Courts. Personally I do not consider that kind of chaos a viable alternative.

This is why we are greatly concerned about various efforts by some of these same Members of Congress to impose riders and other budget limitations that would defund major portions of this overall Plan. The most important implementation element of this restoration Plan is Congress itself. If Congress does not fully fund its part, the BiOp's Plan will most surely fail.

The BiOp is a single tapestry, and it will not hold together legally or politically unless *all* its required treads are woven together and funded in a timely fashion. Plunging the region into widespread chaos, and plunging our own major industry into further economic disaster, are not 'plans' and cannot be considered viable political or economic options.

STATEMENT OF THE PACIFIC COAST FEDERATION OF FISHERMEN'S ASSOCIATIONS

The Pacific Coast Federation of Fishermen's Associations (PCFFA) is the United States west coast's largest organization of commercial fishermen and is a non-governmental, non-profit corporation organized in 1976. As a federation, its membership is composed of 25 U.S. west coast commercial fishermen's port associations and

vessel owner's associations spread from San Diego, California to northern Alaska. Fishermen belonging to PCFFA member organizations engage in a variety of fisheries, including those for salmon, crab, pink shrimp, albacore, rockfish, shark, halibut, swordfish, sea cucumber, sea urchin, squid and herring.

PCFFA provides its member associations with a full time staff to address fisheries education, communications, habitat protection, and legislation. PCFFA represents its member associations at the local, State, regional and national levels on all fisheries issues before many commissions, councils and legislatures throughout the Pacific region, and before the U.S. Congress. PCFFA also has fishermen's health care programs for fishermen belonging to its member associations. PCFFA is involved in fisheries enhancement and publishes print and electronic newsletters to alert the fishing industry to current issues that should concern it.

Since the health of our industry depends on healthy marine and anadromous fishery resources, much of PCFFA's efforts are directed at habitat protection. This includes issues dealing with water quality and quantity, wetlands protection, offshore oil pollution, ocean dumping, water pollution and maintaining the healthy watersheds and estuaries which are the nursery grounds for the many species upon which our industry depends. Our Internet web site is: http://www.pond.net/~pcffa

This site contains Internet links to our member groups, other fisheries organizations and many other useful resources for commercial fishermen throughout the world. It also links to our sister organization, the Institute for Fisheries Resources, which is dedicated to ocean and anadromous resource protection throughout the Pacific.

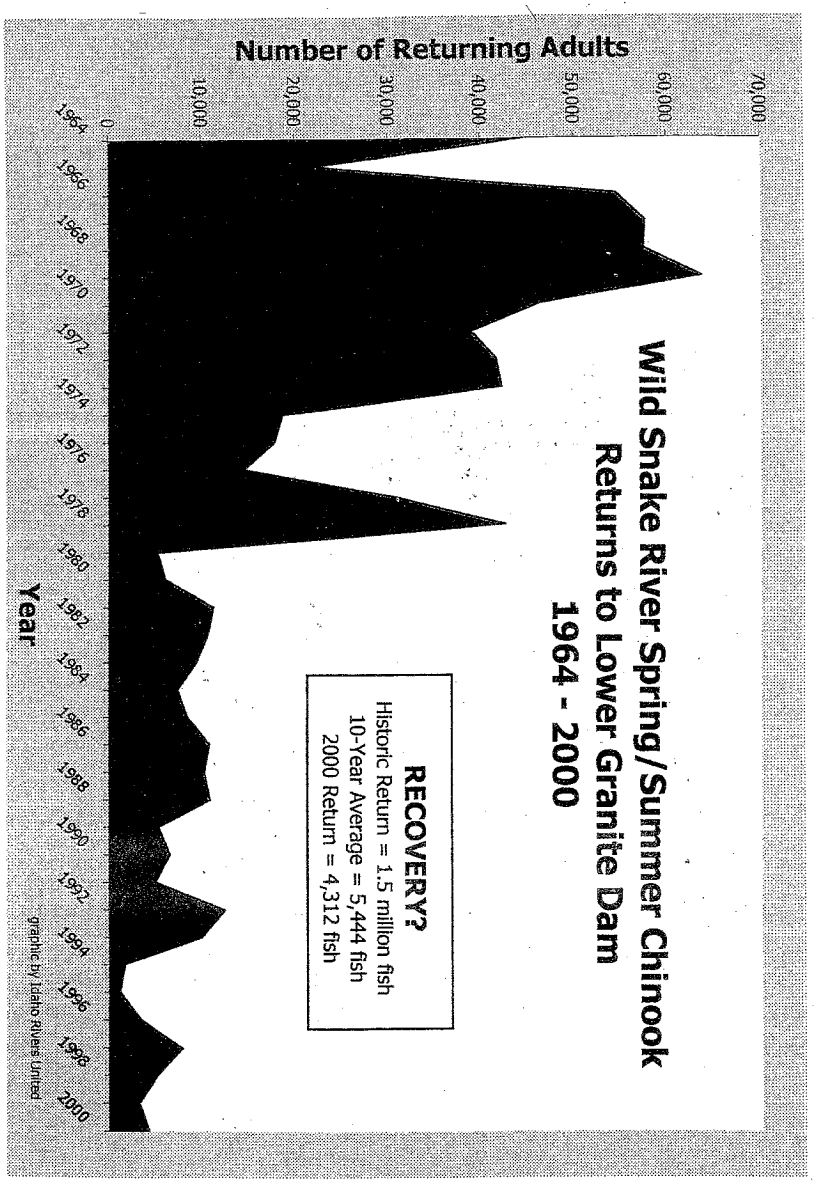
ATTACHMENT A

THE MEMBERS AND BOARD OF DIRECTORS OF THE PACIFIC COAST FEDERATION OF FISHERMEN'S ASSOCIATIONS

The Board of Directors of PCFFA is composed of 25 major commercial fisheries organizations on the U.S. west coast from San Diego to Alaska. Each group is represented on our Board by that group's President, Executive Director or designated Representative. The current Board membership is as follows:

Commercial Fishermen of Santa Barbara, Inc.
Commercial Fishermen's Organization of Morro Bay
Crab Boat Owners' Association
Del Norte Fishermen's Marketing Association
Fishermen's Marketing Association of Bodega Bay
Salmon Trollers' Marketing Association
Half Moon Bay Fisherman's Marketing Association
Humboldt Fishermen's Marketing Association
Moss Landing Commercial Fishermen's Association
Port San Luis Commercial Fishermen's Association
Santa Cruz Fishermen's Marketing Association
Golden State Trollers Association
Small Boat Commercial Salmon Fishermen's Association
Trinidad Bay Fishermen's Marketing Association
Southern California Trawlers Association
Golden Gate Fishermen's Association
Salmon for All
Federation of Independent Seafood Harvesters (FISH)
United Fishermen of Alaska
Ventura Commercial Fishermen's Association
Central California Longline Association
Washington Trollers Association
Western Fishboat Owners' Association
Monterey Fishermen's Marketing Association
Shelter Cove Commercial Fishermen's Association

PCFFA is by far the largest and most politically active organization of commercial fishermen on the U.S. west coast, and is active on all local, regional and national issues affecting our fisheries.



PCFFA Testimony Attachment B
September 14, 2000

APPENDIX 1

COMMENTS BY IDAHO WATER USERS ON THE DRAFT BIOLOGICAL OPINION FOR OPERATION OF THE FEDERAL COLUMBIA RIVER POWER SYSTEM

These comments are submitted on behalf of the Committee of Nine and the Idaho Water Users Association ("Idaho water users") and are directed to the Draft Biological Opinion dated July 27, 2000 for *Operation of the Federal Columbia River Power System Including the Juvenile Fish Transportation Program and the Bureau of Reclamation's 31 Projects, Including the entire Columbia Basin Project* issued by National Marine Fisheries Service, Northwest Region ("Draft BiOp").

The Committee of Nine is the official advisory committee for Water District 1, the largest water district in the State of Idaho. Water District 1 is responsible for the distribution of water among appropriators within the water district from the natural flow of the Snake River and storage from U.S. Bureau of Reclamation ("BOR") reservoirs on the Snake River above Milner Dam. The Committee of Nine is also a designated rental pool committee that has facilitated the rental of stored water to the BOR to provide water for flow augmentation pursuant to the 1995 Biological Opinion. The Idaho Water Users Association was formed in 1938 and represents about 300 canal companies. irrigation districts. water districts. agri-business and professional organizations, municipal and public water suppliers, and others. These comments have been prepared with the assistance of the scientists. biologists, and engineers who have been retained to address Upper Snake River issues involving the Endangered Species Act ("ESA").[1]

SUMMARY OF COMMENTS

The Draft BiOp raises numerous issues. However, the Idaho water users have focused their comments on the specific set of issues pertaining to flow augmentation from the Upper Snake River.[2]

As an overriding issue, there is no need for consultation on the Upper Snake BOR projects. The contractual obligations and operation of these projects have not changed significantly since prior to the passage of the ESA in 1973. Moreover, there have been no changes since the last BiOp on these projects issued in December 1999.

The Draft BiOp violates the ESA by failing to identify the actions of specific projects that cause jeopardy to the listed species or adversely affect their habitat. The 43 projects encompassed by the Draft BiOp are not all interrelated or interdependent. At the very least, the Upper Snake BOR projects must be treated individually or collectively in the BiOp or in a separate consultation.

Flows from the Upper Snake River have slightly increased over the past 89 years, especially during the critical summer months, even with irrigation development in southern Idaho and the construction of the Upper Snake Bureau of Reclamation projects.[3] This development and construction occurred long before the populations of the listed species declined to endangered or threatened levels. Thus, water development in the Upper Snake in general, and the Upper Snake BOR projects in particular, did not alter flows so as to cause jeopardy to the listed species or adverse effects on their habitat.

There is no scientific foundation for conclusions in the Draft BiOp that Upper Snake flow augmentation will provide biological benefits for the listed species. The purported flow/survival relationship for fall chinook above Lower Granite is unfounded and there is evidence that flow augmentation from the Upper Snake BOR projects is actually detrimental to the listed species. Likewise, there are no demonstrated benefits from Upper Snake flow augmentation through the hydropower system, in the estuary, or in the ocean plume for any of the listed species.

Flow augmentation from the Upper Snake has previously been an interim or experimental measure aimed at mitigating the jeopardy and incidental take caused by the Federal Columbia River Power System (FRCPS). There is no basis for the new conclusion in the Draft BiOp that the Upper Snake BOR projects cause jeopardy,

---

[1] Contributors include: Dr. James J. Anderson, School of Fisheries, University of Washington: Craig L. Sommers and David B. Shaw, ERO Resources Corporation: Dr. Richard A. Hinrichsen. Hinrichsen Environmental Services: Dr. William J. McNeil, retired professor of fisheries, Oregon State University. These individuals also contributed to comments by the Idaho water users on the draft White Paper on flow (10/29/99), the draft All-H Paper (3/16/00) and the draft Feasibility Report/Environmental Impact Statement (3/31/00). Résumés of the contributors are provided in Attachment 3.

[2] Throughout these comments, the Upper Snake River ("Upper Snake") means the portion of the basin above Brownlee Reservoir.

[3] In fact. increased summer flows are the result of return flows from Upper Snake irrigation.

with or without providing 427 kaf of flow augmentation. Likewise, there is no basis for the implication in the Draft BiOp that the Upper Snake BOR projects incidentally take listed species. Also, there is no explanation of how NMFS could conclude in December 1999 that the proposed operations of the Upper Snake BOR projects *do not* jeopardize the listed species, and then conclude 6 months later with no new data that the Upper Snake projects *do* contribute to the jeopardy of the species.

Because operation of the Upper Snake BOR projects does not cause jeopardy, there is no basis for the reasonable and prudent alternatives (RPAs) for these projects identified in the Draft BiOp. Specifically, the flow targets established for the mainstem are unreasonable and unfounded. Flow augmentation using 427 kaf or more water is unnecessary and illegal, especially with respect to the use of powerhead space which is contrary to State and Federal laws. The requirement for the BOR to consult on use of uncontracted space does not fully comport with Federal and State law and the proposed consultations are too narrow. Likewise, the description of "unauthorized" uses does not comport with Reclamation law. Pursuit of increased water conservation and reduction of so-called unauthorized uses in the Upper Snake will not increase streamflow. Additional water should not be sought from the Upper Snake. The additional water is not needed and a State law mechanism for providing that water downstream is unlikely. Finally, there is inadequate consideration of resident fish and wildlife needs and other impacts in continuation or expansion of Upper Snake flow augmentation. It is not reasonable and prudent to potentially harm resident species and their habitat when there is no significant benefit to the listed species from the RPAs. Moreover because there is no jeopardy from the Upper Snake BOR projects, NMFS must comply with NEPA in taking actions with respect to these projects.

The biological, hydro, and physical performance standards set forth in the Draft BiOp are flawed. Various standards under these categories are unrealistic, not clearly defined, immeasurable, ineffective, or even detrimental to the listed species.

Harvest reforms can provide significant benefit to the listed species, especially Snake River fall chinook. The RPAs listed for harvest in the Draft BiOp should be revised to require these reforms.

The Magnuson-Stevens Act recommendations for the listed species are premature because Essential Fish Habitat has not been designated for these fish. Moreover, the scope of those recommendations is not clear; and to the extent that they apply to the Upper Snake BOR projects, they suffer from the same defects described for the Section 7 consultation.

To reiterate a central point of these comments, the Idaho water users oppose the inclusion of flow augmentation using 427,000 acre-feet or more water from the Upper Snake River as an RPA. The Draft BiOp should be revised to eliminate Upper Snake River flow augmentation because these BOR projects do not jeopardize the listed species or adversely modify their habitat. Moreover, flow augmentation provides no significant biological or physical benefits to the listed species, and indeed may be harmful.

BIOP SCOPE AND OBJECTIVES ARE FLAWED

From the outset, the Draft BiOp is on the wrong track with respect to BOR projects in the Upper Snake River basin. First, there is no duty for the BOR to consult with NMFS on the operation of the Upper Snake BOR projects because the contractual obligations and operation of those projects have not changed since enactment of the ESA listing of the species, or publication of the last BiOp on these projects. Second, assuming there is a duty to consult. the proper scope of the consultation is to ensure that *specific BOR actions on particular Upper Snake projects* will not jeopardize the continued existence of listed species or adversely modify their habitat. Rather than being lumped together with FCRPS projects and other BOR projects, the Upper Snake BOR projects should be evaluated separately given their unique circumstances. The Upper Snake BOR projects are not interrelated or interdependent' with the FCRPS or other Columbia River basin BOR projects (50 CFR 402.02). Third, there is no basis for a jeopardy opinion on the Upper Snake BOR projects. As a result, the RPAs for the Upper Snake projects are actually mitigation measures for the listed species. Thus, as discussed further below, the Draft BiOp violates the ESA with respect to the Upper Snake BOR projects.

The Upper Snake BOR projects have been operated and contractually obligated to provide irrigation water, and incidentally to provide power, flood control, recreation, fish and wildlife benefits, since their inception in the early 1900's. No significant changes in those operations and contracts have occurred since the final components were constructed in the 1940's and 1950's, long before the enactment of the ESA in 1973 or listing of the species in the 1990's. Thus, there are no new Federal

"actions" in need of consultation with NMFS. Moreover, there is no need to have reinitiated consultation when there have been no operational or contractual changes since the 1999 BiOp on these same Upper Snake BOR projects was completed in December 1999 (see discussion below under *Proposed Action*).

There is no requirement for consultation on the Upper Snake BOR projects with respect to the listed species involved in the Draft BiOp because there is no discretionary "action" that is subject to consultation. "Action" is defined as "all activities or programs of any kind authorized, funded or carried out, in whole or in part, by Federal agencies . . ." and include but are not limited to "(a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts . . .; (d) actions directly or indirectly causing modifications to the land, water. or air." 50 C.F.R. § 402.02. The ESA only requires action agencies to consult or confer with FWS/NFMS when there is discretionary Federal involvement or control over the "action." The storage and delivery of water under the Upper Snake BOR projects is governed by permanent contracts, not discretionary actions. For example, Attachment 2 contains an excerpt from the contract between the BOR and the Twin Falls Canal Company, a representative contract in the Upper Snake. This is a permanent contract that provides among other things that "It is the purpose of the United States and the water users . . . to have the reservoir system so operated as to effect the greatest practicable conservation of water" under the water rights created by the 1923 contract (see Articles 6 and 14(a)). Thus, there is no "discretionary Federal involvement or control over the action" and, therefore, there is no duty to consult. Moreover, as discussed at length below, because operation of the Upper Snake BOR projects does not affect listed species or critical habitat, there is no duty to consult.

At most, the BOR should only engage in informal consultation with respect to the Upper Snake projects with respect to discretionary actions, if any exist. Again, given that the result of the informal consultation should be that any such actions are not likely to adversely affect the listed species or critical habitat, the consultation process should be terminated at that point.

Of course, the BOR previously sought consultation on the Upper Snake projects, which led to the 1999 BiOp. However, since there has been no new discretionary action, and there is no new information, there is no reason to reinitiate consultation.

As set forth at the outset of the Draft BiOp, the "Biological Opinion does not attempt to apportion the relative contribution of the FCRPS and BOR projects to the current status of the ESUs" (p. 1–1).[4] Rather, all 43 projects are combined in the Draft BiOp because they have "hydrologic effects on the flows in the mainstems of the Columbia and Snake rivers" (p. 1–1). This approach ignores the practical and legal differences among these projects. The FCRPS and main stem Columbia River BOR projects are relatively recent, enormous, interrelated projects operating within or near critical habitat for the listed salmon and steelhead. In contrast, the Upper Snake BOR projects are relatively small, were in existence long before the decline of the listed species to critical levels, are located far outside of critical habitat (and in many cases outside of historical habitat), and have had no significant impact on historical downstream flows.

By failing to separately consult on specific actions or at least analyze, understand, and apportion the relative effect of the projects on the species or their critical habitat, the Draft BiOp fails to conform to Section 7(b)(3)(A) of the Endangered Species Act (ESA). That section requires: ". . . a written statement setting forth . . . a summary of the information on which the opinion is based, *detailing* how the agency action affects the species or its critical habitat" (emphasis supplied). The Draft BiOp recognizes that these are separate, unrelated actions being consulted upon. Yet, as discussed thoroughly below, the Draft BiOp does not and cannot provide details on how BOR construction and operation of the Upper Snake projects affect the listed species or their habitat.

The Draft BiOp notes that consultation between BOR and NMFS occurred pursuant to Section 7(a)(2) of the ESA. Unfortunately, the Draft BiOp extends beyond the purpose of the consultation. Section 7(a)(2) consultation is to ensure that actions which are authorized, funded, or carried out by the BOR are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of the critical habitat of such species. Section 7(b)(3)(A) directs the Secretary to provide to BOR a written statement setting forth the Secretary's opinion, and a summary of the information on which the opinion is based, detailing how the agency action affects the species or its critical habitat. If jeopardy or adverse modification is found, the Secretary is required to suggest those reasonable and prudent alternatives that he believes would not violate Section

[4] In these comments, page references refer to the Draft BiOp unless otherwise noted.

7(a)(2). As discussed below, jeopardy to listed species or adverse modification has never previously been determined by the Secretary for the Upper Snake BOR projects. Indeed, just the opposite is true.

In summary, the Draft BiOp should be revised to eliminate the Upper Snake BOR projects. If included in the Draft BiOp, the effects of the Upper Snake BOR projects on the listed species and their habitat should be specifically addressed, or separate analyses should be conducted on these projects. In any event a jeopardy opinion is not legally or factually warranted for any of the Upper Snake BOR projects.

PROPOSED ACTION

It is useful to summarize the historical circumstances leading to the proposed action with respect to the Upper Snake BOR projects in order to provide perspective on the jeopardy opinion and RPAs included in the Draft BiOp.

Flow augmentation from the Upper Snake River was originally requested as an experiment" or an "interim" measure. The Northwest Power Planning Council ("NPPC") suggested flow augmentation as an "experiment" to test the hypothesis that there is a "relationship between spring and summer flow, velocity and fish survival" in an adaptive management framework (NPPC, 1994. p. 5–13). In support of the 1995 BiOp on the FCRPS. NMFS called for "interim target flows"—and thus, flow augmentation—on the basis of the NPPC program and a finding that ". . . a general relationship of increasing survival of Columbia River basin salmon and steelhead with increasing flow is reasonable" (NMFS, 1995, pp. 1, 2). In essence, in the 1995 and 1998 BiOps, the 427 kaf of Upper Snake flow augmentation was included as part of an interim, experimental mitigation package for the jeopardy caused by FCRPS operations or its take of listed species. Despite the lack of scientific evidence or legal basis for flow augmentation, Idaho water users acquiesced in the experimental program and helped pass State legislation to authorize the use of water for flow augmentation. Several years of research were conducted to assess the effects of flow on the survival of listed species. As discussed below and in Attachment 1, no significant benefit from Upper Snake River flow augmentation is evident from the research. Thus, the basis for the NMFS interim flow augmentation no longer exists.

More recently, the 1999 BiOp on the Upper Snake BOR projects, finalized on December 9, 1999 (about 7 months before the Draft BiOp), did not find jeopardy from operation of these projects. The 427 kaf augmentation was included in that BiOp as a continuation of an interim measure required by the 1995 and 1998 BiOps on the FRCPS. In the current consultation, the agencies once again propose to continue the actions undertaken as a result of the 1995, 1998, and 1999 BiOps, i.e., to continue to provide 427 kaf of flow augmentation from the Upper Snake.[5]

In the Draft BiOp RPAs, NMFS includes additional measures to firm the 427 kaf of flow augmentation and seeks additional water to provide even more flow. That decision was made despite the fact that flow augmentation has previously been recognized by NMFS only as an interim measure. and not a permanent means for recovering salmon: "the species biological requirements in the migrators; corridor are likely to be met over the long term only if there are major structural modifications to the FCRPS that result in significant survival improvements" (1999 BiOp, p. II–3). As an interim and experimental measure, Idaho water users have continued to expect that flow augmentation using water from the Upper Snake River basin would be eliminated as part of the long-term decision encompassed in this Draft BiOp, particularly in light of the lack of any scientific support for flow augmentation from Idaho.

HISTORICAL AND HYDROLOGICAL BACKGROUND

In order to provide context for the rest of our comments, some background is useful. The history of irrigation development and the BOR projects in southern Idaho, listed species declines, and hydrology of the Upper Snake River basin are provided below.

History of Upper Snake BOR Projects

The Reclamation Service began studies in most western states and territories for possible projects shortly after the Reclamation Act was passed in June 1902. In Idaho, those surveys led to two early irrigation ventures involving the Snake River watershed. These undertakings are the Minidoka Project, which was initially au-

[5] The proposed actions involving the Upper Snake BOR projects also include using powerhead space in the reservoirs to firm the water supply, a proposal that the Idaho water users consider to be illegal and thus invalid.

thorized in 1904; and the Boise Project, which was initially authorized in 1905. Although several other BOR projects exist in the Upper Snake basin (Michaud Flats, Little Wood River, Mann Creek, and Owyhee), the Minidoka and Boise Projects are the largest.

Minidoka Project lands extend discontinuously from the town of Ashton in eastern Idaho along the Snake River approximately 300 miles downstream to the town of Bliss in south-central Idaho. The project includes: Minidoka Dam (also known as Lake Walcott) on the Snake River near Rupert, Idaho (completed in 1906); Jackson Lake Dam on the Snake River near Wilson, Wyoming (completed in 1911); American Falls Dam on the Snake River near American Falls, Idaho (completed in 1927); Island Park Dam on Henry's Fork, a tributary of the Snake, near Saint Anthony, Idaho (completed in 1938); Grassy Lake Dam on Grassy Creek in Wyoming (completed in 1939): and Palisades Dam on the South Fork of the Snake River (completed in 1957).

Known as the Payette-Boise Project prior to 1911, the Boise Project was built in two parts the first being the Arrowrock Division, and the second being the Payette Division—The Arrowrock Division, which serves lands situated between the Boise and Snake Rivers, was authorized on March 27, 1905 and includes: the Boise River Diversion Dam on the Boise River near the city of Boise (completed in 1908); Lake Lowell (also known as Deer Flat Reservoir) storing Boise River water offstream near Nampa, Idaho (three dams completed between 1908 and 1911): Arrowrock Dam on the Boise River near the City of Boise (completed in 1915); and Anderson Ranch Darn on the South Fork of the Boise River (completed in 1947).

The Payette Division of the Boise Project consists of Deadwood Darn, Black Canyon Darn, and Cascade Darn. The Payette Division serves lands between the Payette and Boise Rivers and areas north of the Payette River in the Emmett Irrigation District. Authorized on October 19, 1998, the Division includes: Black Canyon Darn on the Payette River near the town of Emmett (completed in 1924), Deadwood Dam on the Deadwood River, a tributary of the South Fork of the Payette River (completed in 1931); and Cascade Dam on the North Fork of the Payette River near the city of Cascade (completed in 1948).

In section 6.2.5, the Draft BiOp appears to greatly overstate the impact of Upper Snake BOR projects by attributing 3.8 MAF of depletion to those projects (p. 6–29) because these projects are only part of the development of water resources that has become the backbone of Idaho's economy. Beginning in 1836 on land inhabited by the Nez Perce Indians irrigation expanded to encompass about 1.5 million acres in 1909, largely from private irrigation developments that relied on the natural flow of streams (Arrington, 1986; 1910 Census). Another 500,000 acres was developed largely as a result of storage facilities constructed by the United States in the first half of the 20th century. About 1 million acres is the result of irrigation by wells. most of which have been drilled since the 1950's (IWRB, 1996). Surface and ground water sources in the Snake River basin in Idaho now irrigate over 3 million acres (IWRB. 1996).

History of Listed Species Decline

As described in the Draft BiOp, the listed species have gone through two general periods of population decline (pp. 4–1 *et seq*). The first period of decline was the late 1800s and early 1900s, primarily as a result of high harvest levels (p. 5–8). The second period of decline generally occurred after the 1960's as the result of a number of factors including additional major dams on the Columbia and lower Snake Rivers, and continuing changes in habitat, hatchery effects, and ocean conditions (pp. 5–3 *et seq*). As shown in Figure 1, this second decline resulted in the low population levels. which resulted in the listings under the ESA. It is important to note that the listed salmonid populations were self-sustaining long after water development of the Upper Snake was complete.

Figure 1. Returns of wild salmon and steelhead to the uppermost dam on the Snake River below Hells Canyon (Ice Harbor 1964-68; Lower Monumental Dam 1969; Little Goose Dam 1970-74; Lower Granite Dam 1975-99).



Hydrology of the Upper Snake River

Total annual outflow from Idaho into the Columbia River system is about 70 million acre feet (MAF), or roughly one-third of the total flow of the Columbia River (IWRB, 1996). About one-half of this flow is provided by northern Idaho tributaries and one-half is from the Snake River. Average annual flow of the Snake River as it leaves the State at Lewiston is about 36 MAF (Id). Roughly one-third of this amount comes from the Upper Snake River above Hells Canyon and about one-half is contributed by the Salmon and Clearwater River basins (Id.). The remainder is contributed from smaller tributaries in Oregon. Washington, and Idaho.

Stream flow records do not extend back to the beginning of irrigation in the mid-1800's. However, records for stream flow in the Upper Snake River basin do exist from about 1910 on. As noted in the previous section, the construction of reservoirs and development of irrigation on about 1.5 million acres has occurred since 1910. However, the historical record reflects a slight increase in flow despite development in southern Idaho. Again, it must be recalled that the Upper Snake BOR projects are only part of the irrigation development in Idaho.

Figure 2 shows the actual mean annual flow for the Snake River at the Weiser gage, located just above Brownlee Reservoir, for the period 1911 through 1999. As can be seen from the trend line plotted on the graph, average annual flows have *increased* slightly over the past 89 years despite water development in the Upper Snake River basin. Figure 3 shows the actual mean summer flow for July 1 through August 31 for the period 1911 through 1999 without flow augmentation. This period was selected to match the time during which flow often falls short of NMFS' targets and the season for which there has been concern over juvenile fall chinook migration. Again, the trend line plotted on the graph shows that the measured flows of the Snake River at Weiser have *increased* over the past 89 years during the summer period. As discussed in the next section, analysis of the minimum flow for the flow target periods 4/3 through 6/20 and 6/21 through 8/31 show the same pattern of slightly increasing minimum flows for the period from 1911 through 1999.

The tremendous variation in flows can also be seen in Figures 2 and 3. At Weiser, mean annual flows vary by over 350 percent and summer flows vary by over 300 percent. These fluctuations are primarily the result of natural variations in climate. The 427 kaf of Upper Snake flow augmentation (about 3.5 percent of the average annual flow) is dwarfed by this huge natural flow variation at Weiser. Upper Snake flow augmentation can do little to offset the variability of natural flows below Hells Canyon.

Similarly, the historical hydrology at Lower Granite Dam does not reflect decreasing flows. Figures 4 and 5 show the same trend of increasing mean annual and sum-

mer (July 1 through August 31) flows at Lower Granite for the period 1911 through 1999 as shown for the Snake River at Weiser.[6]

The fact that the quantity and timing of Snake River flow has not changed significantly is not new. In 1995, the National Research Council concluded:

> Because there has not been a major shift in the Snake River hydrograph, it is doubtful a priori that the declines in Snake River salmon stocks are due to or reversible by changes in the seasonality of the flow regime of the Snake River alone (NRC, 1995 at 193).

Despite these facts, which have been repeatedly pointed out to NMFS,[7] the Draft BiOp asserts that the Upper Snake BOR depletions "are a major impediment to meeting NMFS' flow objectives" (p. 6–28). Failure to take these facts into account or respond to them is arbitrary and capricious on the part of NMFS.

[6] Flow augmentation provided in recent years has been subtracted from gage data before plotting the mean flows on Figures 3 and 5.

[7] See Idaho water users comments on the draft White Paper and draft All-H paper.

Figure 2

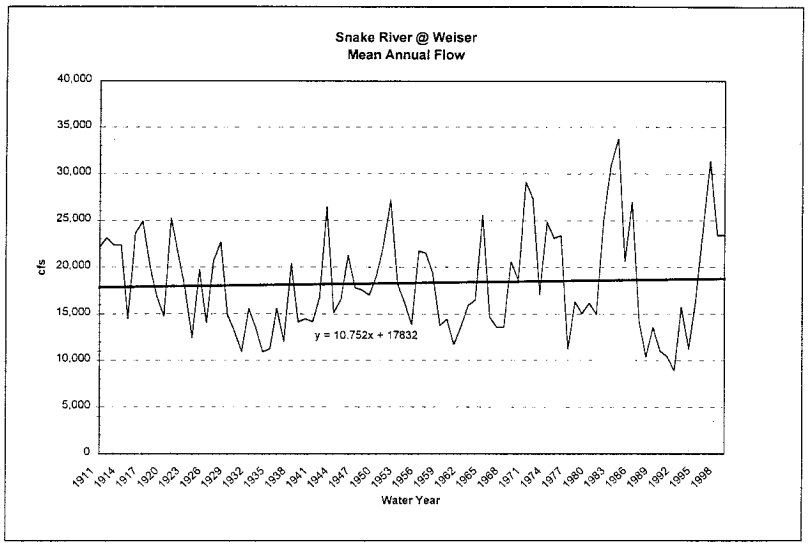


Figure 3

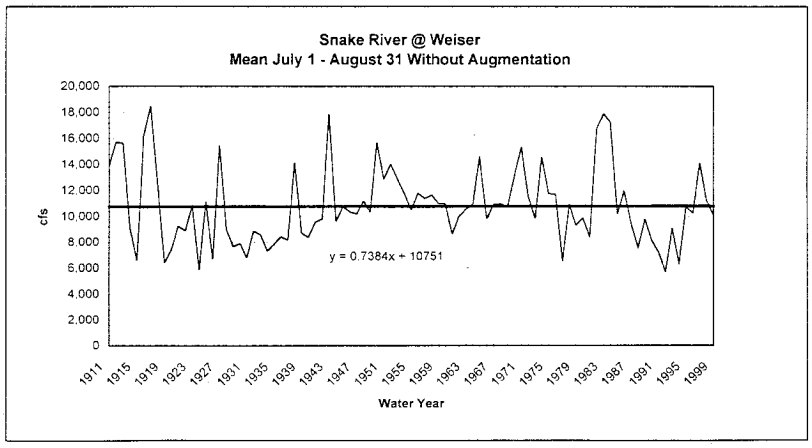


Figure 4

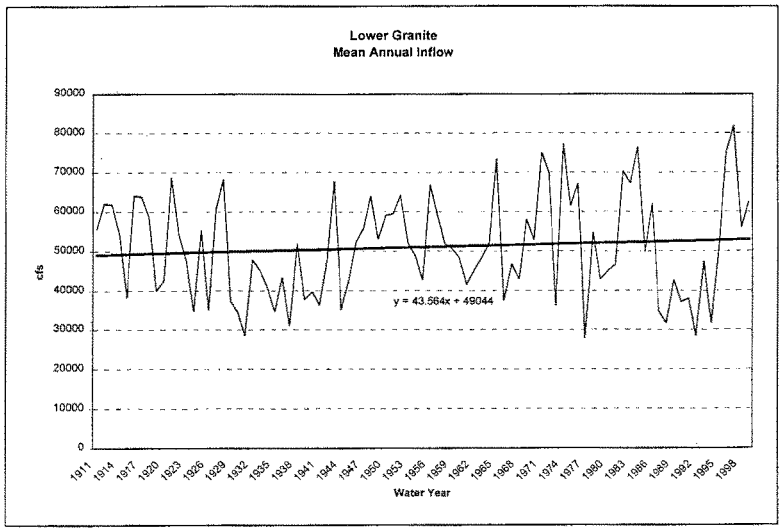
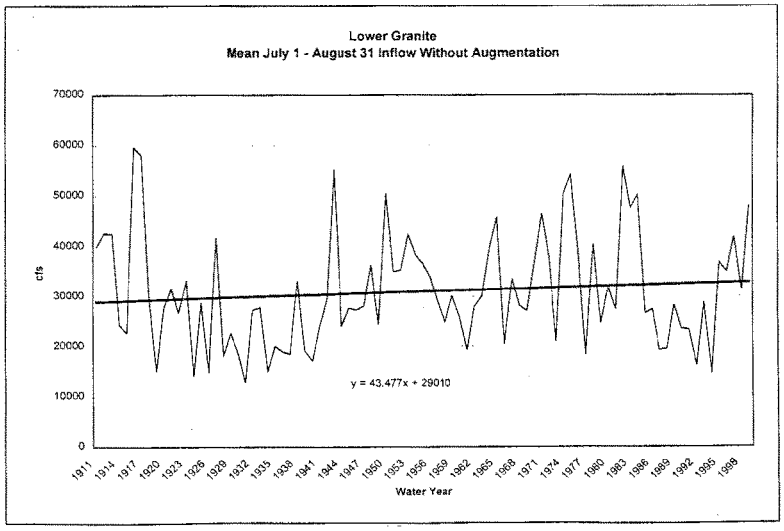


Figure 5



FLOW ALTERATION FROM THE UPPER SNAKE RIVER BOR PROJECTS HAS NOT CAUSED JEOPARDY

In Section 6.2.5.2.3 of the Draft BiOp, NMFS asserts that "[o]peration and configuration of BOR's irrigation projects *could* affect salmon survival . . . [indirectly through] changes in flow timing due to reservoir storage management activities, and streamflow depletion from water withdrawals" (p. 6–27, emphasis supplied). In fact, as discussed in the previous section, the Upper Snake BOR irrigation projects operated for decades prior to the precipitous decline of listed species populations in the 1970's and 1980's, which led to their listing and thus, the projects had no role in the subsequent decline of the listed species. Even with operation of these projects, the average flow of the Snake River at Lower Granite has remained relatively constant through the years and the flow has actually increased during the critical summer months because of irrigation return flows from the BOR operations and other upstream irrigation. Moreover, much of the water diverted from the streams by water users in southern Idaho is done pursuant to State water rights for natural flow. These diversions are not subject to BOR operation and control. Finally, as discussed in the next major section of these comments involving the biological effect of the Upper Snake BOR projects, the relatively minimal flow alteration from these projects has no significant effect on salmonid migration and survival.

As illustrated in Figure 2, the mean annual flow of the Snake River at Weiser has not changed significantly since flow records became available in 1911. Likewise. the variation of flow between years has not changed significantly. Figure 2 is constructed of measured data and is not based on theoretical calculations or assumptions. This time-series analysis is not provided to suggest that Upper Snake irrigation development and BOR storage projects do not consume water or have not affected downstream flow. Rather, these flow records demonstrate that there is no factual support for the premise that flow alterations from the Upper Snake have jeopardized or will jeopardize the listed species.

Figure 6 contains the same mean annual flow data used to prepare Figure 2 and, in addition, shows the development of irrigated acreage in Idaho and the development of Upper Snake BOR water storage.[8] Figure 6 shows that irrigated acreage significantly increased and most of the BOR storage development occurred after flow measurement records for the Snake River at Weiser began. Figure 6 also shows both irrigated acreage and BOR storage increasing throughout the period but without a significant change in the mean annual flow of the Snake River at Weiser.

By the early 1920's, about 2.5 million acres were irrigated in Idaho, yet the BOR had only about 1.5 MAF of storage capacity in the Upper Snake River basin. Many of the irrigated acres were developed with private water rights and without benefit of BOR stored water. The lack of storage for full water supplies is shown, in part, by the decrease in the number of irrigated acres during the drought years of the late 1920's and the early 1930's. As BOR storage became available, many irrigators relied upon the stored water to supplement their private water rights in order to have a full water supply.

Table 6.2–1 and Table 6.2–2 in the Draft BiOp show relatively large *estimates* of the amounts of water consumed by Upper Snake BOR projects and reductions of flow at Lower Granite Dam (pp. 6–29, 6–30). Regardless of those estimated depletions, Figure 6 shows conclusively that both the number of irrigated acres and the amount of BOR storage have increased during the period of record for the Snake River gage at Weiser, which shows a slight increase in the mean annual flow.

This analysis of historical acreage in comparison to flows is similar to the analysis by Dreher and the results are consistent with those found by Dreher (Dreher, 1998, pp. 5–7). Dreher's analysis has been criticized by DeHart (1998) on several bases. The comparison of the development of irrigated acreage and BOR storage over time counters the criticism that the major impacts of Idaho irrigation development were in place prior to the period of analysis. In fact, much of the development, particularly the Upper Snake BOR projects, has taken place during the period of record. DeHart also suggests that the recent low flows are lower than the historical low

[8] The BOR storage represents all reservoirs above Brownlee. The irrigated acreage is taken from Census Reports and include all irrigated acres in Idaho (United States Census Office, 1902–1997). The Census Reports do not separate the number of irrigated acres by river basin within a state. The irrigated acreage reported for Idaho includes acreage outside of the Snake River basin upstream from Weiser including the Bear and Salmon River drainages. Similarly, the reported irrigated acreage does not include acres irrigated from the Snake River basin above Weiser located in Wyoming, Nevada and Oregon. The differences in the chart from actual acreage irrigated from the Snake River basin upstream from Weiser is believed to be minimal since most of the irrigated acreage in Idaho is irrigated from the Snake River basin upstream from Weiser and most of the acreage irrigated from the Snake River basin above Weiser is in Idaho.

flows, and that this change in low flows is masked by an analysis that relies solely on mean annual flow amounts. Figure 7 contains two curves, one for the minimum mean daily flow of the Snake River at Weiser for April 3 through June 20, and one for the minimum mean daily flow of the Snake River at Weiser for June 21 through August 31.[9] The two curves represent the minimum flow for each year during the respective periods. Trend lines are added to the curves and show the minimum mean daily flow for both periods has increased, on average, over the period of record.

The depletion analysis in Tables 6.2.1 and 6.2.2 is in error because it ignores how the Upper Snake BOR projects actually operate. Water is stored in the project reservoirs during the winter and spring (except during major flood control operations when low flows are not an issue) and then released for irrigation purposes during the summer, primarily to supplement natural flow water rights. Thus, any reduction of flow actually occurs during seasons when the flow targets at Lower Granite are typically met (spring) or do not exist (winter). The Draft BiOp's assumption that crop water consumption estimates in a particular month are directly related to the downstream flow depletion for that month is not accurate given the time lag between storage and release of the water.

NMFS apparently relies upon the erroneous *estimates* in Table 6.2–1 and Table 6.2–2 to conclude the Upper Snake BOR projects cause jeopardy for the listed species, yet the *measured* flow of the Snake River at Weiser shows that no change has occurred following much of the irrigation development and nearly all of the BOR storage construction in the Upper Snake River basin. Although the listed species were in decline due to over harvest by the early 1900's, there is no evidence to suggest that the populations were limited by either habitat or passage conditions caused by flow alteration from the Upper Snake. Habitat and passage conditions resulting from Upper Snake flows were the same in the first half of the 20th century as they are today.

Of course, the listed species no longer reach the Snake River at Weiser because they have been excluded from the Upper Snake River basin since the 1950's due to construction of the Hells Canyon complex. Thus, there is no direct effect on the listed species due to irrigation in southern Idaho or operation of the Upper Snake BOR projects. Because the flow conditions of the Snake River at Weiser have not materially changed, and because the population of the listed species has not been limited by habitat or passage constraints imposed by irrigation or BOR storage in the Upper Snake River basin, there is no basis to find jeopardy due to indirect effects. In other words, changes in Idaho water use did not cause and cannot cure the decline of listed fish populations.

[9] Augmentation flow was removed from the records for the recent years before the minimum values were selected and plotted.

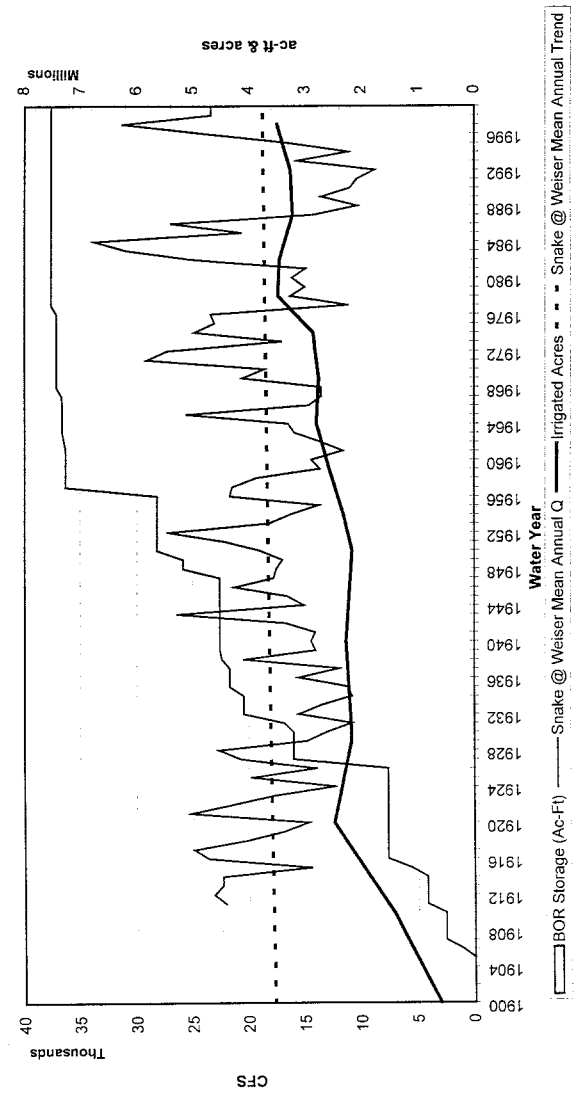
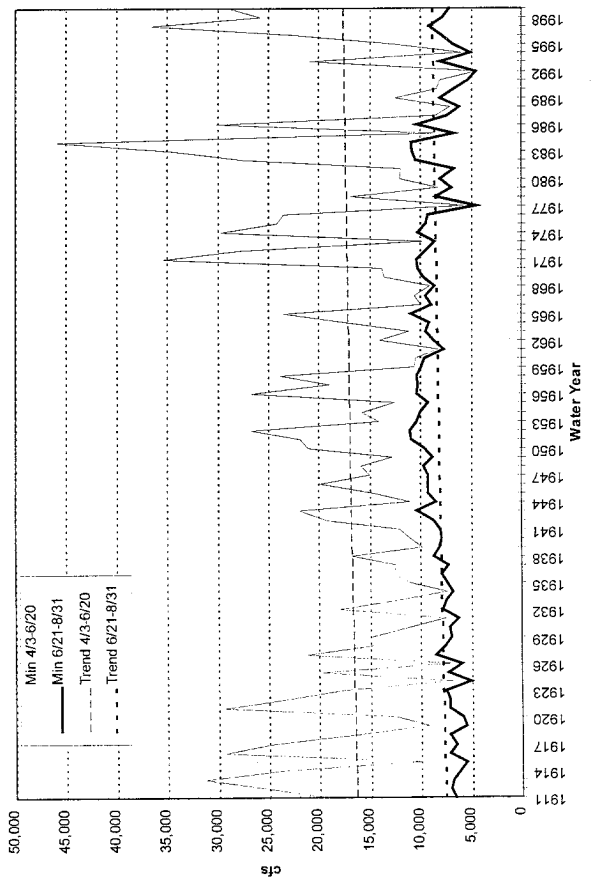


Figure 6. Snake River @ Weiser Mean Annual Flow, Irrigated Acres and Reclamation Storage.

Figure 7.


Snake River @ Weiser
Minimum Mean Daily Flow for Periods Shown
Min 4/3-6/20
Min 6/21-8/31
Trend 4/3-6/20
Trend 6/21-8/31
cfs
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1911
1914
1917
1920
1923
1926
1929
1932
1935
1938
1941
1944
1947
1950
1953
1956
1959
1962
1965
1968
1971
1974
1977
1980
1983
1986
1989
1992
1995
1998
Water Year

THE FLOW-SURVIVAL HYPOTHESIS USED IN THE DRAFT BIOP IS UNFOUNDED

Even if the Upper Snake BOR projects altered the downstream flow, the biological effect of those changes is insignificant to the listed species and their habitat. The Draft BiOp hypothesizes a variety of mechanisms by which historical flow alterations have negatively impacted listed fish and their habitat and by which future flow augmentation can provide benefits. These mechanisms include changes in velocity, turbidity, temperature, and conditions in the estuary or ocean plume (pp. 6–23 to 6–41). There is no reliable evidence that changes in Upper Snake River water use have had or will have a significant effect on these variables or on the bottom line—survival of the listed species.

The Draft BiOp analysis and conclusions related to the flow/survival relationship for listed species rely extensively on the March 2000 White Paper entitled "Salmonid travel time and survival related to flow management in the Columbia River Basin" ("White Paper"; NMFS, 2000a) (pp. 2–3, 2–10, 6–34). Further evaluation of the assertions in the White Paper, and replies to NMFS responses to comments on the draft White Paper are contained in Attachment 1.

Flow and Velocity

The Draft BiOp suggests that downstream migration of juvenile salmon could be improved by using flow augmentation to increase the rate of flow through the reservoirs along the lower Snake and Columbia Rivers to speed up migration (pp. 6–34 to 6–36). However, there are no quantitative analyses of the velocity changes achievable with flow augmentation, objectives for velocity changes, or analyses of the biological benefits of incremental changes in velocity.

The Draft BiOp begins to recognize that Upper Snake flow augmentation is futile to mitigate the velocity reductions resulting from dams on the lower Snake River (p. 6–36). For example, adding 1 MAF annually to existing flows results in less than 1/10th of 1 mile per hour increase in velocity through the lower Snake River reservoirs (Dreher, 1998, p. 12). Stated another way, more than 160 MAF (over 4 times the existing flow) would be required to restore pre-dam velocities that exceeded 2.5 mph (Id.). Clearly, any possible level of flow augmentation from the Upper Snake River would have an insignificant effect on water velocity through the lower Snake River (Id.).

Flow and Turbidity

The Draft BiOp also suggests that downstream migration of juvenile salmon could be improved by increasing the downstream turbidity using flow augmentation (p. 6–36). Again, there are no quantitative analyses of the turbidity changes achievable with flow augmentation, objectives for turbidity changes, or analyses of the biological benefits of incremental changes in turbidity. Moreover, there is no reconciliation of the calls for increased turbidity in the Draft BiOp with the reductions in sediment load required by the Clean Water Act.

Significant increases in turbidity are not likely as a result of Upper Snake flow augmentation. Most instances of increased turbidity in the lower Snake River are the result of high tributary inflows due to storm events or snowmelt.

Flow and Temperature

Flow augmentation is also suggested as a means to improve water temperature in the lower Snake River (p. 6–36). Cold water has been released from Dworshak Reservoir in the Clearwater Basin to lower temperatures in the river for the benefit of salmon (NMFS, 1999, pp. 29–30). However, warm water released from the Upper Snake River counteracts the cooling effect of releases from Dworshak Reservoir, especially during low flow years when temperatures are generally the highest (Corps, 1995, p. 4–61). Once more, the Draft BiOp contains no quantitative analyses of the temperature changes achievable with flow augmentation, objectives for temperature changes, or analyses of the biological benefits of incremental changes in temperature.

To illustrate the problem of augmenting with warm Snake River water, the effect of the existing flow augmentation on the temperature downstream of Brownlee can be estimated.[10] First, it can be demonstrated that the temperature (Θ) in the Snake

[10] Additional information on the flow/temperature relationships described in the following paragraphs will be provided in a paper authored by James J. Anderson and posted on the Columbia River Basin Research website (*http://www.cqs.washington.edu/library.html*) as soon as it is final.

River below Hells Canyon (at River Mile 180)[11] is essentially determined by the sum of the flow-weighted (F) temperatures of the Snake, Imnaha and Salmon rivers according to the formula:

$$\Theta_{Rm180} = \frac{\Theta_{Salmon} F_{Salmon} + \Theta_{Inmaha} F_{Imnaha} + \Theta_{Snake} F_{Snake}}{F_{Salmon} + F_{Imnaha} + F_{Snake}}$$

Figure 8 shows the regression of predicted and observed temperatures at RM 180. The equation predicts the observed temperatures quite well ($R^2 = 0.9989$, slope = 1.0, intercept = (−) 0.17). Figure 9 shows that flow and temperature are not correlated just downstream of Hells Canyon Dam at RM 246. Figure 10 shows that river temperature at Anatone and air temperature at Lewiston are linearly related. These three relationships demonstrate that Upper Snake flow augmentation does not significantly affect the temperature of the Snake River entering Lower Granite Reservoir.

[11] River Mile 180 (RM 180) is below the confluence of Snake, Imnaha and Salmon rivers, about 75 miles upstream from Lower Granite Dam (RM 106).

Figure 8. Observed temperature and predicted temperature at RM 180.

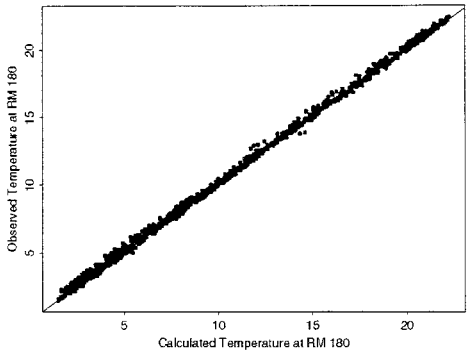


Figure 9. Flow is unrelated to temperature immediately below Hells Canyon dam. Data covers years 1991-1997.

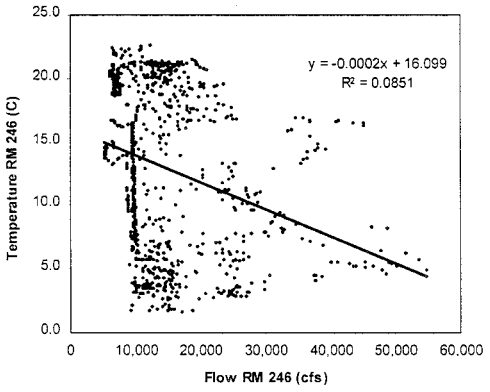
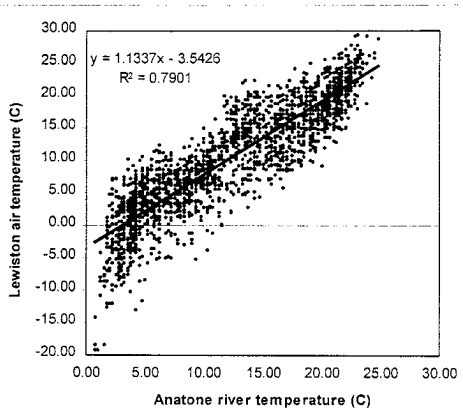


Figure 10. Air and water temperature are correlated. Data from years 1991 to 1997.



The effects of Upper Snake flow augmentation on downstream temperature at RM 180 can be calculated by changing Snake River flows (F_{Snake}) to reflect different levels of flow augmentation. Figure 11 illustrates the difference in river temperatures at RM 180 with the additional 427 kaf. Note that Snake River flow augmentation has a small effect on the river temperature and that the augmentation typically causes river temperature to increase relative to the predicted temperature without augmentation. This graphically illustrates the problem with the assumption that flow augmentation is uniformly good for fish. In fact, the model indicates that Snake River temperatures would be reduced if Snake River flows were held constant. This is illustrated in Figure 12, which shows the predicted difference in river temperature caused by existing flow augmentation relative to temperatures with a constant Hells Canyon flow of 5000 cfs.

Figure 11. Temperature change resulting from the existing flow augmentation.

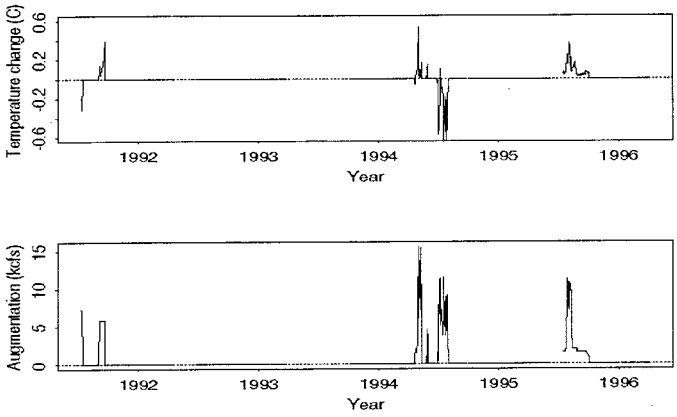
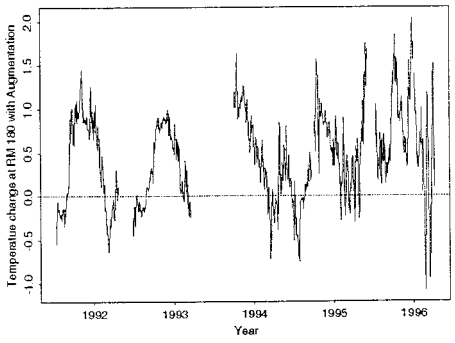


Figure 12. Temperature increase with the existing flow augmentation relative to temperature if Hells Canyon flows were limited to 5000 cfs.



A study of the limnology of Brownlee reservoir supports the detrimental effect of summer flow augmentation from the Upper Snake under some conditions (Ebel and Koski, 1968). The study found that the reservoir stratifies in the summer with the epilimnion (warm upper layer) extending down to or below the outlet works in July, August and September during the period of study (Id., Fig. 2). The study also evaluated the effect of the reservoir on Snake River flows above and below the Hells Canyon dams. Relative to Snake River inflows to Brownlee, temperature was higher and dissolved oxygen levels were lower below Oxbow from mid-summer through fall (Id., Fig. 20). Thus, Upper Snake flow augmentation during times such as these would exacerbate the impact of water releases that are of poorer quality than inflows and which can be detrimental to fish.

Estuary/Plume Effects

Flow augmentation also is being hypothesized as a way to change the timing of the arrival of smolts at the estuary to pre-dam conditions (p. 6–34). The suggested

use of flow is perplexing for two reasons. First, about 80 to 90 percent of Snake River chinook and steelhead passing through the estuary arrive through transportation. Transportation shortens the hydrosystem passage by two weeks for spring chinook and a month or more for fall chinook, resulting in estuary arrival times similar to the pre-dam conditions. Under the existing hydrosystem operation, only 10 to 20 percent of migrating fish travel in-river. At most, flow augmentation may only change the arrival time of the remaining 10 to 20 percent of in-river migrating fish by a few hours for spring chinook and a few dams for fall chinook, although we do not concede that such reductions will occur (see discussion below). Unless it can be demonstrated that these small changes in arrival timing will occur *and* will benefit the survival of listed fish, attempting to use flow augmentation to speed arrival timing at the estuary for a small proportion of the fish is a gross misuse of water resources.

In a further attempt to find some basis for flow augmentation, the Draft BiOp suggests that higher flows *might* improve conditions in the estuary and provide survival benefits to juvenile salmonids migrating through the estuary or the Columbia River plume (p. 6–24. 6–34). As discussed above under *Hydrology of the Upper Snake River*, the volume and pattern of flow in the Snake River upstream from Lower Granite Reservoir has not changed significantly over the past 89 years. Thus, any changes that may have occurred in the Columbia River estuary or plume are not the result of upstream development on the Snake River. Further, the Upper Snake flows required to make significant changes in the estuary or plume are so large that any attempt to use Snake River augmentation water for that purpose is futile.

Table 1 compares minimum and maximum monthly discharges of the Columbia River at Beaver Army Terminal near Quincy, Oregon with the monthly discharge of the Snake River at Weiser during the same month. The Beaver Army Terminal gage is located at river mile 53.8 within the area of the river affected by tidal flow. Even though the gage record is short—12 years of records, some partial, from 1968 through 1999—it serves to show the wide variation in annual flow of the Columbia River. The *variation* in *monthly* flow from high to low years (18.5 MAF in June) is more than the entire average *annual* flow of the Snake River at Weiser (13.3 MAF).

Table 1 illustrates that the flow of the Columbia River at the beginning of the estuary is at least 10 times greater than the flow of the Snake River at Weiser under both high and low flow conditions. It is impossible to try to restore the lower Columbia to pre-development conditions using augmentation from a source that provides less than 10 percent of the flow during the spring and summer.

Table 1.—Minimum and maximum monthly discharge of the Columbia River compared to Upper Snake River discharge in that month

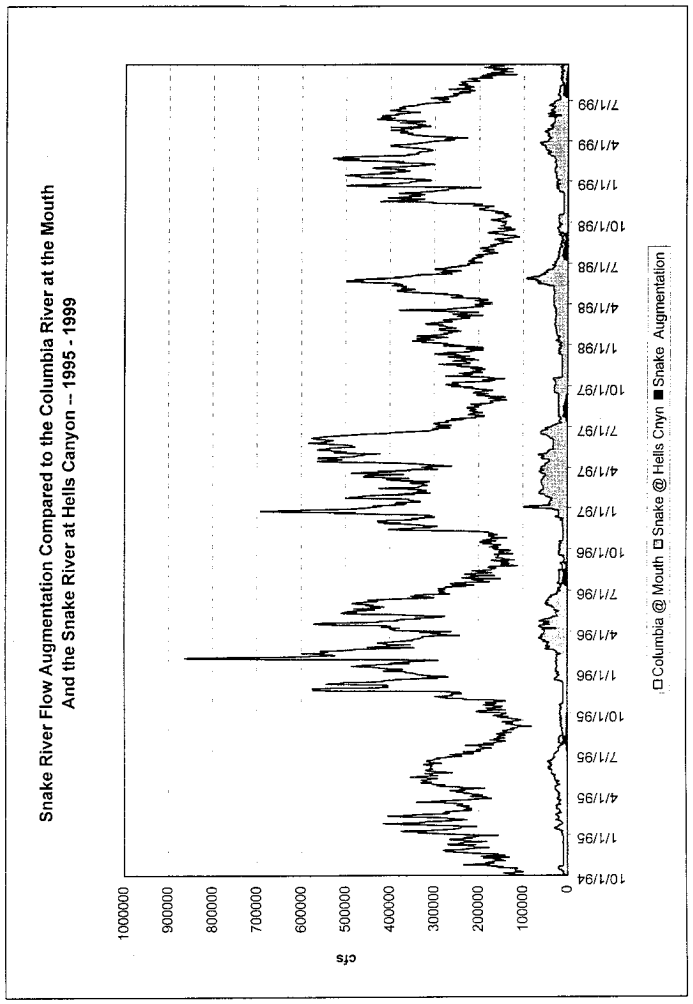
Month	Minimum Flow (MAF)			Maximum Flow (MAF)		
	Year	Lower Columbia River	Upper Snake River	Year	Lower Columbia River	Upper Snake River
April	1992	11.7	0.5	1969	24.2	2.3
May	1968	13.0	0.7	1997	31.2	2.5
June	1992	12.1	0.3	1997	30.6	2.9
July	1992	8.6	0.4	1997	17.2	1.1
August	1994	6.6	0.5	1999	13.7	0.8

Another way to consider the futility of using flow augmentation from the Upper Snake River to cause changes far downstream is to compare the period of record average flow of the Columbia River at Beaver Army Terminal for July, a relatively low flow month during the period of flow objectives, to recent levels of Upper Snake River flow augmentation. The average monthly flow of the Columbia River for July at this location is 14.1 MAF for the period of record at the Beaver Army Terminal gage. If the *entire* 427,000 acre-feet of Upper Snake River flow augmentation were released in July (contrary to past practice), it would be only 3 percent of the average monthly July flow of the Columbia River at Beaver Army Terminal. Figure 13 shows Upper Snake River flow augmentation from 1995–1999 in relation to the flow of the Columbia River at the mouth.

Simply put, augmenting flows to significantly change the estuary or plume would be fruitless and a waste of water resources. Moreover, this rationale for additional

water is premature given the research plan in the RPAs to study whether there is any benefit from additional flows (p. 9–133 *et seq*).

Figure 13.



The Flow/Survival Relationship

There is no clear scientific basis for the mainstem flow targets and the requirements for flow management to meet those targets. Flow management involves augmentation or reshaping the volume of water flowing out of the Columbia/Snake River system over the season. Although there may be a weak flow/survival relationship *between years*, flows and survival have no relationship in the hydrosystem *within a season*. The relationship between fall chinook survival and flow above Lower Granite Dam cited in the Draft BiOp is statistically unfounded. Relationships noted in the BiOp relating flow or travel time to smolt-to-adult returns (SARs) are all compromised by the increasing number of dams over time, changing ocean conditions and changes in the hydrosystem.

The Draft BiOp gives a false impression that there is conclusive support for flow targets and misrepresents the NMFS flow analysis. For example, the Draft BiOp concludes that flow is strongly correlated with survival:

> To summarize, there are several studies which indicate a relationship exists between river conditions when juveniles out-migrated and the rate at which adults returned from those juvenile year classes. Years of higher river flow produced higher rates of adult returns than low water years. (p. 6–35).
>
> Research conducted since 1995 suggest[s] that the spring flow objectives in the Action Agencies proposed action for the Snake and Columbia rivers are reasonable. (p. 6–36).

Yet, the White Paper is considerably more cautious about any effects of flow on smolt travel time and survival:

> Correlation does not necessarily imply causation (Sokal and Rohlf 1981), and higher SARs associated with higher flows does not necessarily indicate that SARs can be increased by adding more flow to the river. (White Paper, p. 52)
>
> Thus, a relationship between adult returns and river flow might be the result of other factors correlated with river flow. (Id.)
>
> In all cases where studies were updated to remove years before the hydropower system was completed and include more recent data, the newly obtained relationships were weaker than the previously published ones. In some cases, the newly analyzed data set did not contain the full range of water travel time or flows as in previous studies. (Id.)

The last quote correctly notes that the hydrosystem has changed significantly with the addition of more dams over time. Moreover, the Draft BiOp and the White Paper fail to address the fact that the system has continued to change with improvements in smolt passage facilities and transportation. In addition, changes in ocean conditions greatly complicate the evaluation of hydrosystem survival.[12]

The Draft BiOp focuses on Upper Snake summer flow augmentation to directly benefit juvenile Snake River fall chinook and provide qualitative benefits to other runs as well (p. 6–36). However, NMFS acknowledges that: (1) "*relationships between flow and survival and between travel time and survival through impounded sections of the lower Snake River*" are neither strong nor consistent; and (2) a causal relationship between flow and smolt-to-adult returns (SAR) is not supported by recent data and analyses (White Paper, pp. 17, 22, 52). These issues are discussed further below.

As noted above, the Draft BiOp relies extensively on the White Paper on flow/survival, which we further address in Attachment 1.

Yearling Migrants (Spring/Summer Chinook and Steelhead)

In its White Paper, NMFS asserts:

> A strong and consistent relationship exists between flow and travel time. Increasing flow decreases travel time. Thus, although no relationship appears to exist within seasons between flow and yearling migrant survival through the impounded sections of the Snake River, by reducing travel times, higher flows *may* provide survival benefits in other portions of the salmonid life cycle and

[12] A growing body of scientific evidence indicates that the northern Pacific Ocean was in a warm cycle from the mid-1970's to the mid-1990's. These warm conditions adversely affected salmon production in the Pacific Northwest. Current evidence indicates the northern Pacific Ocean is now cooling and salmon production is increasing (Hare and Mantua, 1999, p. 1; JISAO/SMA Climate Impacts Group, 1999. p. 14; Taylor, 1997 and 1999; Casillas, 1999; Espenson, 2000). As a result, management improvements over the past two decades may have been offset by poor ocean conditions. We may not know what is really working and what is not working. Kevin Friedland states the resulting issue succinctly: "Management policy that is predicated on Freshwater production trends and political trends and ignores decadal scale trends in ocean productivity is doomed to Failure" (Fried land, 1999).

> in free-flowing sections of the river both upstream and downstream from the hydropower system. Snake River basin fish evolved under conditions where the travel time of smolts through the lower Snake and Columbia Rivers was much shorter than presently exists. Thus, higher flows, while decreasing travel time, *may* also improve conditions in the estuary and provide survival benefits to juvenile salmonids migrating through the estuary or the Columbia River plume. By reducing the length of time the smolts are exposed to stressors in the reservoirs, higher flows also *likely* improve smolt condition upon arrival in the estuary (White Paper, p. 22, emphasis added).

This speculative description of the possible benefits of decreased travel time from flow management in the face of weak and inconsistent data is evidence that there is no rational basis for flow augmentation and that inclusion of such augmentation from the Upper Snake is arbitrary without supported careful analysis from the scientific evidence in the record. Careful analysis of the mechanisms, uncertainties, and quantification of these speculative indirect impacts is conspicuously absent. Moreover, survival is the issue, not travel time.

NMFS reports a strong association between travel time and flow and concludes that travel time is a function of flow (White Paper, pp. 12–17, 22). However, the correlation appears to be invalid due to a collinear relationship between flow and time of year (photoperiod).[13] Flows measured by the U.S. Army Corps of Engineers at Lower Granite Dam at 15-day intervals in 1995 and 1996 are given in Table 2. As seen in the table, there is a consistent increase in flow over time during the downstream migration of smolts. Both flow and photoperiod increased synchronously over the period of study. Thus, conclusions concerning flow as the variable controlling travel time are highly speculative.

An analysis of tagged juvenile hatchery chinook based on smolt migration through Lower Granite Reservoir from 1987 through 1995 concludes that photoperiod provides a better basis to predict travel time than flow, and that travel time can be predicted by flow only because the relationship between flow and time is collinear.[14]

Table 2.—Flow at Lower Granite Dam

Date	1995	1996
April 1	46 kcfs	81 kcfs
April 15	78 kcfs	132 kcfs
April 30	84 kcfs	98 kcfs
May 15	96 kcfs	139 kcfs
May 30	111 kcfs	156 kcfs
June 14	120 kcfs	170 kcfs

NMFS and other agencies should further evaluate potential collinear effects among variables before arriving at firm conclusions for yearling migrants. As discussed below for sub-yearling migrants (fall chinook), confounding effects probably exist from collinearity between flow and other environmental variables such as water temperature and turbidity. In addition, the relationship of survival to other independent variables such as the physiological State of the juveniles, size of the juveniles, predation, competition, and ocean conditions should be explored.

Quantitative estimates demonstrate that flow augmentation is ineffective even at maximum possible levels. Year to year, a small relationship between flow and SAR is evident in some stocks. However, the resulting benefits to the listed species are likewise small when considered in terms of actual range of flow increases that can be achieved with flow augmentation. Moreover, the correlation of survival with *annual* flows is not likely to equate to significant changes in survival from flow augmentation *within a season*. Nevertheless, consistent results reflecting minimal potential benefits from annual flow changes emerge from several analyses.

For example, the theoretical effect of flow augmentation on Snake River spring/summer chinook and steelhead SARs can be estimated through relationships of flow, water travel time (WTT), and SAR. Flow augmentation of 427 kaf from the Upper Snake decreases WTT between Lower Granite and Bonneville by one-half day (Dreher, 1998, p. 12). Based on the correlation of SAR to WTT in Table 15 of the

[13] Collinear means that the predictor variables (e.g., temperature, flow, travel time, and time of year) are highly correlated with each other. Thus, any correlation of the variables to the dependent variable (salmon survival) is confounded by the other variables.

[14] See Attachment B in the comments submitted by the Idaho water users on the draft White Paper submitted to NMFS on October 29, 1999.

White Paper, this would only result in a change in SAR of about 0.04 for both steelhead and spring/summer chinook.

In other examples, augmentation from the Upper Snake River of 1 MAF could provide an 8 kcfs increase in flow over a 2-month season.[15] A recent study determined that an 8 kcfs flow change might result in a change in SAR from 0.010 to 0.011 for four fall chinook stocks (Anderson et al., 2000). Similarly, using a mean flow of 150 kcfs in the mainstem Columbia River and the data in the White Paper, an 8 kcfs increase might equate to a change in SAR for Upper Columbia wild steelhead of 0.0155 to 0.0164. Only in the NMFS analysis for Marsh Creek spring chinook is there any discernable correlation of year-to-year flow to survival (NMFS 2000a). For that stock, the slope of the regression was relatively large with a change in the spawner-recruit ratio from 1.0 to 1.4 using an 8 kcfs increase on a 75 kcfs base. However, with respect to this one possible exception, if the Marsh Creek relationship were causative and widespread, the strength of the correlation would be evident in tremendous and obvious success from the past flow augmentation program. Instead, the continued decline of the stocks during the flow augmentation program is more in accordance with an insignificant or null effect of flow augmentation on adult survival.

Sub-Yearling Migrants (Fall Chinook)

A review of available data and recent research supporting and defending flow augmentation for fall chinook leads to the conclusion that Upper Snake River flow augmentation provides no significant benefit to survival of the listed species for the following reasons:

1. Flow augmentation should be the focus of analysis, not natural variations in flow. Upper Snake River flow augmentation provides no beneficial changes in important environmental variables such as date of migration. temperature and turbidity.
2. Flow is a poor predictor of survival and the effect of flow on survival cannot be reliably estimated. Other environmental variables such as time of migration, water temperature, and turbidity are more strongly correlated with survival.
3. Survival is also more likely related to other independent variables such as the physiological state of the juveniles, size of the juveniles, predation, competition, and other factors.[16]
4. There is no statistically significant relationship between flow and spawner-recruit data for fall chinook over brood years 1964–1994.

Recent Studies Above Lower Granite Reservoir

There are serious flaws in recent biological research that is being used to support and defend flow augmentation to benefit ESA-listed anadromous fish runs. The published results of this research raise serious concerns about the methods being used in these studies and the conclusions drawn from the results. These concerns include the confounding effects from correlation between flow and other environmental variables such as photoperiod, water temperature, and turbidity. In other words, changes in survival appear to be in response to variables other than flow. Flows naturally decrease during the migration period for juvenile fall chinook. As discussed below, other variables also change during this same period, which can lead to spurious correlations of flow to survival (Anderson, et al., 2000).

The Draft BiOp assumes without comment that flow augmentation is beneficial under all conditions. The analysis by Anderson Hinrichsen and Van Holmes (Anderson et al., 2000) demonstrates that flow augmentation with warm water is detrimental to salmon smolts. This mistake reflects the *ad hoc* manner in which the science on flow was incorporated into the Draft BiOp. The White Paper, in a cursory analysis, determined that Hells Canyon flow is correlated with survival as are the other environmental variables such as temperature and turbidity. The Draft BiOp assumes that flow augmentation would then be beneficial to fall chinook smolts irrespective of any causative linkage. An extensive analysis of the fall chinook data by Anderson et al. (2000) concluded otherwise; that Hells Canyon flow augmentation is detrimental to fall chinook.

Anderson et al. statistically demonstrated that during the season, migration timing and temperature are better predictors of survival than flow (later timing and higher temperatures reduce survival).[17] In fact, multiple correlation rejects *seasonal*

---

[15] Of course, flow augmentation with 427 kaf can only provide about 27 days of a flow increase of 8 kcfs and a corresponding decrease in potential SAR changes.

[16] See our October 29, 1999 comments on the draft White Paper and literature cited therein.

[17] The occurrence of higher flow also correlates with the occurrence of lower temperature and earlier migration (earlier release of fish). While temperature and migration timing correlate with survival, flow and travel time do not. However, since all of the variables change in synchrony, each factor individually correlates with survival.

flow as a predictor of survival. This means that within-season flow changes, such as through flow augmentation, are even less likely to be significantly correlated with survival than between-season changes. Anderson et al. further demonstrated that the correlation between flow and water temperature for Snake River flow augmentation can reverse from natural conditions so that flow augmentation increases Snake River temperature. Because temperature is likely to be a causative factor in the survival pattern (higher temperature increases predation), when augmentation increases temperature, it decreases survival. In other words, summer flow augmentation with warm, clear water from Brownlee *decreases survival* for Snake River fall chinook (Anderson et al., 2000, p. 58).

The cursory analysis of flow in the White paper and the *ad hoc* application of the results in the Draft BiOp results in a flow augmentation strategy that is not only ineffective, but in this case, is detrimental to fish. In fact, while the Draft BiOp seeks to increase Upper Snake River flow augmentation, the science suggests that in fact this augmentation should be eliminated.

SAR v. *Flow*

Anderson et al. (2000) evaluated spawner-recruit data for several index stocks of fall chinook for various brood year data sets extending back to the 1960's. No statistically significant relationship between natural variations in flow and recruits per spawner was found. Although not statistically reliable, a small positive relationship exists. However, even if additional data proves the relationship to be valid, the effect would not be biologically significant because the benefits of flow would be slight. Moreover, as discussed in the previous section, it must be emphasized that it is not clear that flow is the operative variable, and it is not apparent that flow augmentation provides any of the benefits of a naturally high-flow year.

Smolt-to-adult returns (SAR) or survival encompasses life stages between juvenile seaward migration and adult spawning. The high mortality during various life stages contributes to low SARs. For example, optimistic survival levels for fall (ocean-type) chinook are: spawning to juvenile migrant (≈0.115), juvenile migration (≈.610), marine feeding (≈.015), adult migration (≈.600), and pre-spawning (≈.950).[18] Total life cycle survival contributing to SAR can be approximated by multiplying the survival fractions, i.e., SAR≈0.115×0.610×0.015×0.600×0.950≈0.0006. Thus, survival for juvenile migration (≈0.610) represents less than 1 percent of the total SAR. A similar example for spring/summer Snake River chinook also shows that the SAR for juvenile migrants (≈0.60) is a tiny fraction of total SAR (≈0.00014) (BPA et al., 1999, pp. 4–9—4–11). Thus, there is little prospect for associating SAR with environmental variables such as flow.

Finally, the Draft BiOp does not evaluate the effects of Upper Snake flow augmentation on the listed species. The analysis in the Draft BiOp uses the SIMPAS smolt passage model to assess the impacts of hydrosystem operations on smolts. However, because this model has no flow-survival component, the Draft BiOp cannot evaluate the impacts of flow management. Rather than quantitatively address the relative benefits of flow, if any, the Draft BiOp chose to rely on qualitative assertions.

JEOPARDY OPINION

This is the first BiOp in which NMFS has concluded that the operation of the Upper Snake BOR projects is likely to jeopardize the continued existence of these listed species or adversely affect their critical habitat (pp. 8–2 et seq). None of the previous BiOps contain such an opinion or conclusion—including the 1999 BiOp addressing the Upper Snake BOR projects that was released just 7 months prior to this Draft BiOp. No relevant new data or analysis is provided on the specific effect of these projects on the listed species or their habitat. Thus, the jeopardy opinion on operation of the Upper Snake BOR projects has no basis. The only logical explanation, and one that is suggested in the analysis, is that the conclusion derives from the decision to simultaneously consult on all 43 projects—some of which have been previously determined to cause jeopardy (FCRPS projects) and others which have only been part of a mitigation or recovery strategy (including the Upper Snake BOR projects).

It is deeply disturbing that the Draft BiOp concludes that the Upper Snake BOR projects cause jeopardy while providing the 427 kaf of flow augmentation called for in previous BiOps. There is no evidence that the historical operation of the projects would cause jeopardy, let alone when operated to provide flow augmentation water.

[18] See Attachment 4 to the Idaho water users comments on the draft All-H Paper, which can be found at http://www.nwppc.org/recommend/recommend.htm.

Indeed, the original reason for providing 427 kaf was to mitigate jeopardy caused by the FRCPS. Yet, now NMFS concludes in the Draft BiOp that operating the Upper Snake BOR projects to provide flow augmentation will jeopardize the species.

If NMFS is now concluding that the Upper Snake BOR projects cause jeopardy, then that conclusion appears to be based solely on the depletion analysis in the Draft BiOp (pp. 6–27 to 6–30). The implied logic is that these projects significantly deplete the downstream flow during the migration/flow target season and that those depletions adversely affect the survival of the listed species or their habitat. As discussed in the previous sections, the hydrological and biological underpinnings of the flow alteration hypothesis for jeopardy caused by the Upper Snake BOR projects are not sound. There has been virtually no change in the volume of historical outflow from the Upper Snake, flows increased during the critical summer period, and there is no scientific basis for the conclusion that Upper Snake flow augmentation from BOR projects will benefit the listed species or their habitats.

In fact, the Draft BiOp itself questions the logic of the depletion analysis. Although asserting that "flow depletions caused by BOR-based irrigation activities are a major impediment to meeting NMFS' flow targets the text goes on to recognize the BiOp analysis as speculative (p. 6–28). After acknowledging that water law would allow other appropriators to take much of the supply made available by altering BOR operations, the Draft BiOp concludes "therefore, although the following analysis attributes substantial streamflow depletion effects to BOR project operations it is not clear that BOR could, with any reasonable degree of certainty, avoid these effects" (Id.). A jeopardy opinion without certainty and based on speculation fails to meet, by definition, the standard of reliance on the best scientific data available required by Section 7(a)(2) of the ESA. Moreover, such an opinion has no rationale basis, and is arbitrary.

UPPER SNAKE REASONABLE AND PRUDENT ALTERNATIVES

The Draft BiOp lists six RPAs that apply to the Upper Snake BOR projects: pursue flow targets; provide 427 kaf of flow augmentation using powerhead space if necessary; consult on uncontracted space; improve water conservation; address unauthorized uses; and negotiate for additional water (pp. 9–35 to 9–54). Each of these RPAs is addressed below.

As a general matter, Idaho water users oppose continued Upper Snake River flow augmentation because there is no evidence that the release of an enormous volume of water over the past 14 years has contributed to the survival of Snake River spring and summer chinook, steelhead, or sockeye populations, or any other listed species.[19] Development of water resources in the Upper Snake River basin did not cause the decline of fish populations and has not resulted in the destruction or adverse modification of critical habitat. Continuing to reduce Upper Snake River water uses to provide flow augmentation will not reverse the fish population decline, recover the populations, or mitigate the adverse modification of critical habitat caused by activities in the lower Snake and Columbia Rivers.

As discussed above, there is no legal or factual basis that the Upper Snake BOR projects cause jeopardy to the listed species or adversely affect their habitat. As such, there is no basis for justifying these actions for the Upper Snake BOR projects as reasonable and prudent alternatives to their very existence and operation. At most, these actions should be characterized as offsite measures intended to mitigate the incidental take caused by FRCPS operations.

LOWER GRANITE FLOW TARGETS ARE UNREASONABLE AND UNFOUNDED

Table 3 contains the NMFS' flow objectives in the Draft BiOp for the Snake River at Lower Granite Dam (p. 9–40). These flow objectives are the same as those set forth in the NMFS' 1995 and 1998 BiOps on operation of the FCRPS.

Table 3.—NMFS flow objectives, Snake River at Lower Granite Dam

Spring (4/3–6/20)	85–100† kcfs
Summer (6/21–8/31)	50–55† kcfs

†Varies based on water volume forecasts.

[19] From 1986 through 1999. flow augmentation from Idaho has involved 3.4 MAF from the Upper Snake, 2.3 MAF from Brownlee, and 13.5 MAF from Dworshak for a total of 19.2 MAF from Idaho.

The basis of the flow targets in the 1995 and 1998 BiOps is set forth in a 1995 report by NMFS (NMFS, 1995). The White Paper supplants the 1995 report as the hydrological and biological basis for continuation of the identical flow targets in the Draft BiOp.

As discussed below, the flow targets at Lower Granite Dam are unreasonable because they cannot be reliably met and do not reflect the wide natural variation in flows. Those flow targets are unfounded given that flows remain similar to or are better than historical conditions and there is no biological basis for the flow objectives.

The RPA for flow augmentation from the Upper Snake is largely driven by the desire to meet the flow targets at Lower Granite Dam and farther downstream (p. 9–39). However, these seasonal flow targets identify flows that cannot be achieved on a reasonable or frequent basis. For example, under the Draft BiOp analysis, the flow targets are *never* met in August and would only be met 8 percent of the time if all Upper Snake BOR projects did not deplete any flows.[20] Flow targets that can be met seldom, if ever, are unreasonable by definition. Indeed, the goals of increasing spring and summer flows while limiting winter/spring drawdown and increasing the probability of reservoir refill are mutually exclusive and hydraulically impossible.

As described earlier in these comments, flow objectives are not necessary at Lower Granite because current flows are approximately equal to historical flows in both amount and timing. This is particularly true during the summer when irrigation return flows have increased the amount of water leaving the Upper Snake. Indeed, the 1999 BiOp on the Upper Snake BOR projects recognizes that average streamflows at Lower Granite in August are virtually identical under natural flow conditions and content conditions (1999 BiOp, p. 27). Given that the average flow in August at Lower Granite has always been around 31 kcfs, there is no basis for NMFS' current flow target of 50 to 55 kcfs and the BOR should not be required to provide water from the Upper Snake basin to meet this unrealistic, and unjustified, objective.

Another perspective on the unreasonable level of the flow targets is evident from the fact that enormous volumes of flow augmentation from southern Idaho would have been needed to meet those targets, especially in dry years—over 10 MAF would have been needed in 1977 and 1992, or nearly the total storage capacity of the largest 80 reservoirs in the Snake River basin (Dreher 1998, p. 13).

Furthermore, the flow targets are also unreasonable in light of the enormous natural variation in runoff. A range of 5 to 15 kcfs in the low to high ends of the flow targets does not properly reflect that the range of Snake River flows at Weiser varies 350 percent from year to year (1999 BiOp, p. 25; see also Figures 2 and 6 in these comments).

Most importantly, the flow targets have no clear biological basis. As discussed in previous sections of these comments, there is no relationship between survival and flows through the hydrosystem within a season. Above Lower Granite, the purported relationship between fall chinook survival and flow is statistically unfounded. Indeed, Upper Snake flow augmentation is detrimental to fall chinook survival. Relationships noted in the Draft BiOp relating flow or travel time to higher smolt-to-adult returns (SARs) are not valid with respect to Upper Snake flow augmentation.

Flow Augmentation Using 427 kaf or More, and the Use of Powerhead Space, is Unnecessary and Illegal

As thoroughly discussed in the comments above, there is no scientific evidence that flow augmentation from the Upper Snake will provide significant hydrological or biological benefits to the listed species and their habitat. Thus, flow augmentation from the Upper Snake BOR projects is unnecessary. Furthermore, the Draft BiOp's RPA for the Upper Snake BOR projects ignores several aspects of Reclamation law and Idaho water law.

NMFS instructs the BOR to annually provide 427 kaf irrespective of the authorized purposes of the BOR projects involved (p. 9–48). A prime example is the requirement to use powerhead water to provide flows during drought (p. 9–49).

Each of the projects in the Upper Snake River basin was built pursuant to specific Congressional project authorizations. The authorized purposes of the projects are dictated by those Congressional authorizations. The primary authorized purpose in each case is to supply irrigation water. Only some of these projects are authorized to serve fish and wildlife purposes as a secondary priority. A discussion of the au-

[20] As discussed elsewhere in these comments, the impact of Upper Snake BOR project depletions are overestimated and any flow benefits are speculative. Moreover, if the BOR projects did not deplete flows. senior irrigators would be able to do so under State water law.

thorized purposes for each Upper Snake BOR project should be contained in the final BiOp and the Action listed at the bottom of page 9–48 should be revised to read ". . . pursuant to State and Federal law. . . ."

One of the authorized purposes of the Minidoka and Palisades Projects is power production. Contrary to this authorized purpose, NMFS requires the BOR to use water released from powerhead space in the event that the 427 kaf cannot be acquired by other means (p. 9–49). There are legal constraints that prohibit this use. In the Upper Snake projects that have a power component, the development of power was necessary for the irrigation of the lands under the reclamation project and the power generated by the reclamation project is reserved for use on that project. In 43 USC § 522, Congress has clearly provided that neither surplus power or power privileges will be used so as to impair the efficiency of the irrigation project. The cost of power is based upon the cost of production. Powerhead space is used to provide hydraulic head for the generation of power. Without this hydraulic head, the efficiency of generating power is reduced or generating units will not operate properly and must be shut down. In turn, the increased costs for power directly affect the efficiency of the irrigation project by increasing costs.

On the other hand, if this proposed use is based upon the premise that the powerhead *water* is "surplus," 43 USC § 521 provides that the BOR must obtain the approval of the spaceholders in the storage facility for release of that water. This section of the code further provides that such water shall not be released for other uses if the delivery of such water is detrimental to the water service of the irrigation project. When powerhead space is released, carryover storage is reduced and the potential for refill is affected. No approval by the spaceholders has been obtained by the BOR. In fact, the BOR has been placed on notice that such use is unauthorized and the water users may be damaged by such unlawful use.

In addition, the storage and distribution of water in each of the Upper Snake BOR projects is controlled by a State water right issued by the State of Idaho for such uses, as required by the Reclamation Act of 1902. The BOR does not have discretion to use the storage and distribution facilities without regard to State law. In terms of powerhead space, the State water right for the projects does not allow for release and refill of the space. In addition, Idaho Code Section 42–1763B, which provides State law authority for the BOR to make salmon water releases, does not include powerhead water.

Under Section 7 of the ESA, the BOR is only required to take those actions that are within the agency's authorities to accomplish (16 U.S.C. Sec. 1536(a)(1)). The ESA does not create new authority or repeal existing authorities. The BiOp must set forth the authority under State and Federal law, if any, for the BOR to release powerhead water. In the absence of such authority, this element of the RPAs for the Upper Snake must be deleted.

Consultation on Uncontracted Space

The Draft BiOp requires the BOR to consult with NMFS before entering into any agreement with respect to uncontracted space in order to identify potential additional supplies for salmon water (p. 9–50). However, as discussed in the previous section, any change in the use of this space must be consistent with Reclamation law and State water law. Due consideration should also be given to the environmental, economic and social impacts of such changes.

NMFS sets forth a policy of "zero net impact [from any BOR commitment to a new contract or contract amendment to increase the authorized use of water] on the ability to meet the seasonal flow objectives established in this Biological Opinion" (p. 9–51). Given the unrealistic summer flow target at Lower Granite (50 to 55 kcfs), this virtually guarantees that there will be no further development with water from Bureau reservoirs.

As discussed previously in these comments, the correlation between irrigated acreage and flows from the Upper Snake is weak to non-existent and does not justify NMFS' policy in this area. For example, the 1999 BiOp notes that the number of irrigated acres in Idaho has decreased by 215,000 (6.2 percent) since 1978 and the amount of land receiving water from Bureau projects has decreased by 26,000 acres or about 1.6 percent (1999 BiOp, p. VII–1). However, there has been no significant increase in flows and the fish populations have not rebounded. Moreover, these changes should be factored into the "zero impact policy." At a minimum, ail existing water uses from Upper Snake BOR projects should be allowed to continue and Idaho should be allowed to return to the 1978 level of irrigated acreage.

In terms of environmental, economic, and social impacts from changes in the use of uncontracted space, the BOR should be required to request assistance from the U.S. Fish and Wildlife Service, the Idaho Department of Fish and Game, and the State of Idaho to evaluate the impacts from any changes in uncontracted space.

Uncontracted space in reservoirs above Hells Canyon is currently used for a variety of non-irrigation purposes (e.g. conservation pools, mitigation, reservoir evaporation and streamflow maintenance). NMFS should not attempt to force reallocation from existing needs to flow augmentation.

We request that the provision for consultation on uncontracted space be modified to clarify that any BOR action with respect to uncontracted space should be consistent with State and Federal law and that consultation be expanded to include all affected agencies and stakeholders.

Upper Snake Conservation Will Not Increase Streamflow

The Draft BiOp identifies water conservation through improved irrigation efficiency as a reasonable and prudent alternative to increase the water available for instream flows (p. 9–51). However, on an annual basis, the flow from the Upper Snake River would not be significantly increased by changes in irrigation efficiency because water losses from irrigation inefficiency already return to the river above Hells Canyon (Reclamation, 1999, pp. 3–4). Moreover, increased efficiency is likely to reduce return flows during the summer months—a time when the Draft BiOp indicates that additional flows are needed. Also, as alluded to in the Draft BiOp, in most cases, the "conserved water" would be used by the next junior water user downstream and the water would not become available for flow augmentation. There is no mechanism in Idaho law to "protect such water from diminishment" because these junior water rights are valid rights. As a result of these undisputed facts, there is no basis for this Upper Snake RPA and it should be deleted from the BiOp.

Addressing Unauthorized Uses

NMFS asks the BOR to investigate the unauthorized diversion and use of BOR-supplied water (p. 9–51). NMFS foresees that the BOR will need to take a contract action that will result in an additional opportunity to consult under Section 7. However, many of these occurrences may not be contract violations over which the Bureau may have authority, and may be a valid exercise of State water rights. The distribution of water is controlled by State law, as clearly set forth in Section 8 of the Reclamation Act. Only the State of Idaho has authority to commence enforcement actions for the unauthorized use of water. Again, this RPA should be eliminated from the BiOp as clearly being beyond the scope of the BOR's existing authority.

In any event, such action is unlikely to yield additional water for downstream use for the same reason as water conservation—the water will simply accrue to the benefit of a junior water right holder.

Negotiation for Additional Water

The Draft BiOp calls for negotiations to increase the supplies of water available for flow augmentation from willing sellers and lessors (p. 9–53). However, the interim and experimental use of Upper Snake flow augmentation should be ceased, not expanded. As thoroughly discussed above, flow augmentation from the Upper Snake BOR projects does not provide significant biological or physical benefits to the listed species or their habitat. Adding more water will not provide benefits.

Correctly, the RPA acknowledges that such additional supplies need to be obtained through State law mechanisms. Renewal of State authority for large blocks of flow augmentation is highly unlikely; even if it occurred, there may not be water available ever year. Any attempt to force water to be released from the Upper Snake River basin involuntarily will be vigorously opposed.

Resident Fish and Wildlife, Economic, and Other Impacts

In evaluating the Upper Snake RPAs identified in the Draft BiOp, there is no evidence that NMFS considered resident fish and wildlife species, economics or other local impacts in the Upper Snake basin resulting from the alternatives NMFS that asserts are both "reasonable and prudent." Without evaluating these impacts, there is no assurance that flow augmentation is either reasonable or prudent. Flow augmentation from the Upper Snake lowers reservoir levels, changes stream flow conditions, impacts other endangered species, and affects water quality both in the reservoirs and downstream. Moreover the BOR has identified numerous socioeconomic impacts associated with efforts to acquire water for flow augmentation, including direct costs to agriculture. hydropower, recreation and municipal uses, secondary economic impacts, and changes in social well being (U.S. Bureau of Reclamation, 1999). The proposal for flow augmentation is a major Federal action significantly affecting the quality of the environment and a NEPA analysis on the impacts of these Upper Snake mitigation actions is required before these measures can be demanded by NMFS. The scope of the NEPA analysis must include impacts of the alternatives

(including a "no action" alternative) on resident fish and wildlife populations, recreation, power generation at the Upper Snake BOR projects water quality, and socio-economic.

PERFORMANCE STANDARDS

A number of the performance standards set forth in the Draft BiOp are flawed. These hydro, biological, and physical standards are the measures with which NMFS will assess progress toward survival and recovery of the species and will adjust, if necessary, its RPAs over the next decade.

The FCRPS hydro standard for juvenile passage (Table 9.2–2 of the Draft BiOp) is based on the combined survival in fish transport, in-river passage, and any delayed mortality of the transported fish. An adult standard is also given in Table 9.2–2. In addition to the hydrosystem survivals, minimum additional improvements in life cycle survival are identified to meet the jeopardy standard after achieving the aggressive hydro survival levels (Table 9.2–3). These hydro performance standards are not clearly defined and are unlikely to be measurable within the 5- to 10-year timeframes for re-evaluation.

The biological performance standards based on population growth and survival are unreachable under realistic levels of population growth. Three biological standards are identified but they are not connected so all three must be achieved individually.

Physical performance standards are described as target levels for items such as flow and water quality. The physical performance standards are unconnected to population performance or survival, are likely to be ineffective, and may be detrimental to fish. Because the physical standards are established in terms of targets, there is no mechanism to assess their effectiveness or optimize their use. These issues are discussed in the following sections.

Hydro Performance Standards

A number of problems make the hydro standards unusable. The hydrosystem measure is a "total system survival" standard including transportation, in-river survival, and delayed mortality. The NMFS-derived total system survival uses a mixture of NMFS and PATH formulas. The overall approach would be clearer if NMFS had simply used the PATH formulation for system survival and transportation percentages. Also, the NMFS approach only provides approximations because it assumes that fish are only transported from Lower Granite. A more critical issue is that the estimation of the differential delayed mortality ("D" value), extra mortality, and system survival are problematic. NFMS used average values from the passage models developed in PATH, and ad hoc and unsupported passage estimates to estimate these factors. These problems are critical because these factors determine whether fish are recovering as a result of various actions or if the recovery is a result of natural changes in ocean conditions.

Using average results from the two passage models used in PATH produces unclear results. First, the conclusions from the two passage models are mutually exclusive. Using the FLUSH model, mortality is high in the hydrosystem and there is no trend in extra mortality. Using the CRiSP passage model, the extra mortality occurs concomitant with the Snake River dams and the shift in ocean conditions. Furthermore, NMFS' PIT-tag survival studies discredit the FLUSH model. If NMFS chooses to ignore these important facts in its use of PATH results, it must reanalyze the data using a single model that is supported by the PIT-tag data. A second alternative is to apply its own SIMPAS model and re-evaluate the differential delayed mortality or extra mortality. In either case, SMFS' approach of ignoring its own data and averaging fundamentally different models cannot be supported.

NFMS does not describe its methods to evaluate how extra mortality and total system survival change over the next 5 to 10 years. The Draft BiOp states:

> That is, if conditions during the two periods are similar, then some factoring may be necessary to ensure that the progress evaluation is truly assessing progress of actions undertaken and there results are not masked by ambient conditions (e.g. environmental or hydrologic). (page 9–11 of the Draft BiOp)

However, the factors of extra mortality and delayed mortality are inextricably bound to environmental and hydrologic factors. It appears that NMFS does not detail a method for assessing progress because it has not addressed the complexities of the issues. Furthermore, averaging results from PATH is an imprudent approach that does not resolve the complexities of fish recovery.

Total system survival includes a factor for differential delayed mortality ("D"), which depends on the D factor developed in PATH to quantify the level of extra mortality experienced by transported fish relative to fish passing in-river. The value

of D estimated by NMFS is 0.63 with a confidence interval spanning from negative numbers to greater than 2 (NMFS 2000b). The aggressive RPA will yield a total system survival that is within a few percent of the current "total system survival." For example, from the NMFS BiOp spreadsheets, the base period system survival from 1980 through 1991 is 47 percent, the current period (1994–1999) is 56.0 percent, and the aggressive hydrosystem actions project a system survival of 56.7 percent (NMFS 2000c). Given that the range in D confidence intervals is 100 percent, the 0.6 percent difference between current and a target survival is insignificant. How will NMFS use such a measure to assess hydrosystem performance?

The D value is a highly-calculated and theoretical term with an unknown ecological foundation. It could reflect additional stress that fish experience in transportation or it could be just the opposite, where both weak and strong fish survive transportation and the weak fish naturally die after transportation. In contrast, the weak fish could be culled prior to their arrival in the estuary during in-river passage. Thus, the level of D can be interpreted as a problem with transportation or it may reflect the natural distribution of weak and strong fish in the population. The hydro standard, which is a trigger and criteria for assessing dam removal and other actions, tacitly assumes that D reflects a problem in the transportation system. This uncertainty in mechanisms associated with D creates a serious problem with using total system survival as a performance measure. Simply put, it is unclear whether the measure reflects natural or anthropogenic factors but the change in the D value is being used as a measure of the success or failure of the anthropogenic factors.

Another problem with the hydro standards lies in the SIMPAS model being used to evaluate the effect of hydro actions. The stated purpose of the model is to assess passage through various routes based on empirical data. However, this simplistic model ignores the effects of year-to-year and seasonal variations in supersaturation, temperature, and flow on fish passage and survival. Thus, the SIMPAS model cannot assess the impacts of water quality and flow measures on smolt survival.

Biological Performance Standards

The biological standards are unattainable and immeasurable. Also, it is unclear how the multitude of survival standards will be used in the decisionmaking process.

The biological standards are based on the percent improvement in population expressed as "lambda." The underlying mathematical and ecological basis of the approach, the estimation of the parameter values in the models, and the use of a limited historical dataset to extrapolate long-term performance of the stocks are problematic. The technical difficulties are evident in the scientific debate on how to formulate lambda. The CRI group has presented various techniques for formulating lambda, has made a number of errors in the development of the values, and has been remiss in providing confidence estimates with the estimated numbers. In lieu of stating the confidence interval of lambda, the BiOp gives best- and worst-case estimates of the improvement in lambda that are required to meet the standards. The resulting range of estimates is problematic for several reasons. At one end of the range (the worst-case where large population growth is needed to achieve recovery), the estimates equate to some stocks increasing to levels approaching the entire Columbia/Snake River population (Hinrichsen, personal communication). On the other end of the range, the best-case estimates indicate that no improvements are required to meet all standards. However, even in the best-case conditions, the Draft BiOp would still require that the hydro and physical performance standards be met.

Projections of lambda over a century are misleading and inappropriate. To estimate lambda, NMFS only used data after 1980 while the PATH analysis used the data series back to the 1950's. The interpretation of the PATH analysis became highly controversial because the analysis could not separate the effects of long-term changes in ocean productivity from the effects of the Snake River dams. In an attempt to avoid this controversy, NMFS ignored data prior to the construction of the Snake River dams. However, this strategy has serious consequences. The brood years 1980 through 1994 (the last full brood year in the NMFS analysis) experienced some of the warmest North Pacific conditions, which resulted in some of the lowest productivities for all Northwest salmon. This analysis tacitly assumes that the 15 years of historically poor ocean conditions between 1980 and 1994 will characterize the next 100 years. In reality, the NMFS projections represent the worst-case conditions. In addition, the lambda analysis treats temporal changes in productivity by assuming changes are random and not cyclic; therefore, it consistently underweights recent improvements in productivity, whether they are from natural causes or the result of recovery actions.

The wide range and large variance of lambda estimates indicate that it will be difficult to reliably estimate changes in lambda for progress evaluations in 2005 and

2008. Due to the major problems in the formulation and measurement of the biological standards in the Draft BiOp, those standards must be revised.

Physical Performance Standards

The physical standards are inefficient and, in some cases such as with the flow targets, they are unrealistic and unfounded. The physical standards (including flow targets, tributary habitat, sediment input, and water quality) are disconnected from each other as well as other performance standards. Therefore, success from natural processes or other actions that lead to recovery will not be considered in the physical standards. For example, under the structure of the physical standards, water resources will be wasted trying to meet flow targets if other RPAs or changes in ocean conditions result in sufficient improvement in survival of the listed species.

As discussed elsewhere in these comments, the flow targets. especially at Lower Granite. are unrealistic given that they cannot be reliably met. In addition there is no scientific basis for those targets.

ADDITIONAL HARVEST RESTRICTIONS ARE A MORE EFFECTIVE WAY TO CONSERVE FALL CHINOOK

It is hard to think of a more perverse policy than to allow the harvest of substantial numbers of listed fish, particularly as they come up river to spawn. The Idaho water users are not aware of any other species listed under the ESA where regular harvest within the boundaries of the United States is allowed. Adults that are killed on their way upstream have survived the life stages with the two largest components of mortality—incubation/rearing and ocean feeding—only to be taken a short time before spawning. The Draft BiOp suggests that there is potential to improve survival of the listed species by further reductions in harvest (p. 9–115). Idaho water users strongly support aggressive harvest strategies, options, and actions, especially with respect to fall chinook. Minimizing harvest is extremely cost effective relative to the enormous investments and tremendous uncertainties associated with the hydropower (flow augmentation or breaching), habitat, and hatchery options.

With respect to fisheries, Idaho water users strongly support pursuit of harvest reform through the use of selective fisheries, alternative methods and gear, and increasing harvest in terminal areas (p. 9–116). We believe that these alternatives can provide Tribal fishing opportunities while still reducing the impact of harvest on listed species.

A substantial number of listed species continue to be harvested in the ocean and the main stem Snake and Columbia Rivers. In-river harvest rates for Snake River spring/summer chinook have ranged from 3 to 8 percent in recent years (Marmorek et al., 1998, p. 14). Snake River fall chinook are subjected to heavy fishing pressure (NRC, 1995, p. 82; Marmorek et al., 1999, p. 15). Table 4 shows combined ocean and river harvest rates of up to 75 percent for fall chinook (Peters et al., 1999, p. 71; see also NRC, 1995, pp. 81, 82).

Reducing harvest rates will improve the probability of recovery by 100 percent or more (Peters et al., 1999, pp. 197, 198).

Table 4.—Fall Chinook Exploitation (Harvest)

Run Year	Mainstem (Columbia and Snake Rivers)		Ocean Exploitation Rate by Age				
	Exploitation Rate		2	3	4	5	6
	Jack	Adult					
1986	0.055	0.469	0.015	0.106	0.170	0.169	0.303
1987	0.037	0.560	0.037	0.156	0.140	0.159	0.169
1988	0.046	0.524	0.027	0.060	0.288	0.172	0.159
1989	0.026	0.432	0.038	0.151	0.233	0.227	0.172
1990	0.028	0.452	0.042	0.059	0.271	0.252	0.227
1991	0.044	0.276	0.026	0.051	0.138	0.212	0.252
1992	0.051	0.166	0.020	0.095	0.242	0.204	0.212
1993	0.050	0.254	0.006	0.079	0.244	0.204	0.204
1994	0.033	0.155	0.015	0.014	0.229	0.204	0.204
1995	0.025	0.115	0.016	0.047	0.074	0.169	0.204
1996	0.039	0.171		0.046	0.000	0.158	0.169
Mean	0.039	0.325	0.024	0.079	0.184	0.194	0.207
Min	0.025	0.115	0.006	0.014	0.000	0.158	0.159

Table 4.—Fall Chinook Exploitation (Harvest)—Continued

Run Year	Mainstem (Columbia and Snake Rivers)		Ocean Exploitation Rate by Age				
	Exploitation Rate		2	3	4	5	6
	Jack	Adult					
Max	0.055	0.560	0.042	0.156	0.288	0.252	0.303

The goals for improving hydrosystem survival are small and, as discussed previously in these comments, it is impossible to measure any incremental change that may be related to Upper Snake flow augmentation. However, the effect of harvest reduction can be clearly identified and the harvest reduction equivalent to the potential benefits of flow can be shown to be small and insignificant. To demonstrate the equivalence between small harvest reductions and large flow increases, we apply the approach developed by Norris (1995, 2000). Norris used the Pacific Salmon Commission Chinook Model to define equivalent harvest reduction policies for endangered Snake River fall chinook salmon. Because the stocks are harvested in a gauntlet of mixed-stock fisheries from Alaska to Oregon. the overall exploitation rate on Snake River fall chinook can be reduced by a variety of means, each of which has different economic consequences for the fisheries. Eight general types of policy alternatives were considered by Norris. Four policy options reduce harvest in specific geographic regions: the Alaska. British Columbia, or Washington and Oregon ocean fisheries. or the Columbia River fishery. Two policies reduce harvests in all regions in equal or scaled amounts; and two reduce harvests only in U.S. waters by equal or scaled amounts. Scaled policies reduce regional harvests in proportion to estimated regional catches of Snake River fall chinook during the period 1979 through 1993. Policies were deemed equivalent when the overall adult equivalent exploitation rate on the indicator stock (Lyon's Ferry Hatchery) was reduced by the same percentage. Equivalent policies were shown to be independent of assumptions about stock productivity.

Table 5 illustrates the tradeoffs between harvest and downstream survival by showing all possible solutions to reaching a specific escapement goal. In the Norris study, the goal was defined as 3,000 Snake River fall chinook spawners in year 2017. The model illustrates the change in harvest reduction to achieve the goal. For example, improving downstream survival 36 percent, reducing harvest by 60 percent, and improving upstream survival to 90 percent is equivalent to improving downstream survival by 360 percent, reducing harvest by 30 percent, and making no improvements in upstream survival.

Table 5.—Downstream survival rates for various harvest rate reductions and prespawning survival rates required to achieve 3,000 spawners in year 2017. For example, if harvest rates are reduced by 30 percent, downstream survival rates would have to equal 0.582 (if prespawning survival is 0.6) or 0.364 (if prespawning survival is 0.9)

Percent Harvest Reduction	Prespawn Survival = 0.6	Prespawn Survival = 0.7	Prespawn Survival = 0.8	Prespawn Survival = 0.9
0	1.034	0.870	0.745	0.650
10	0.847	0.712	0.609	0.531
20	0.699	0.587	0.503	0.438
30	0.582	0.489	0.418	0.364
40	0.488	0.410	0.350	0.305
50	0.412	0.346	0.295	0.257
60	0.350	0.294	0.251	0.218
70	0.299	0.251	0.214	0.186
80	0.257	0.215	0.184	0.160
90	0.222	0.186	0.159	0.138

The relative benefits of flow augmentation and harvest reduction can be evaluated using Table 5 and the estimates of life cycle survival improvements with flow augmentation. Although not statistically significant. a correlation of Snake River fall chinook SAR with year-to-year flow estimated that 0.5 MAF of Upper Snake flow augmentation would change survival by 1.6 percent (Anderson et al, 2000). In other words, total system survival would increase from 24.4 to 24.8 percent using the estimate for Snake River fall chinook in the Draft BiOp (NMFS 2000d). Using Table

5, and assuming the lowest pre-spawning survival of 60 percent (which requires the largest change in harvest) the goal of 3000 spawners can be achieved by reducing harvest 82.6 percent with flow augmentation or by reducing harvest by 83.7 percent without augmentation. The average ocean and river harvest rate during the period used in the Norris analysis are 36 percent and 50 percent. Thus, the harvest rates to meet the 3000 fish goal with flow augmentation are 6.4 percent for ocean harvest and 8.9 percent for river harvest. Without the 0.5 MAF of Upper Snake flow augmentation, the rates are 6.0 percent and 8.3 percent.

Under these worst-case conditions (optimistic estimates of the effect of flow augmentation on survival and pessimistic estimates on the number of spawners), a further change in harvest rate of 0.5 percent is equivalent to the effect of the Upper Snake River flow augmentation. It is important to note these calculations assume that a flow survival correlation between year-to-year flows will become statistically significant and if so, the same increases in survival can be achieved using flow augmentation within a year. It also assumes that the statistically insignificant flow survival relationship is strictly due to the water flowing down the river when the fish are migrating. In actuality, many environmental factors are correlated with seasonal flow including ocean productivity and the over wintering conditions of the fish prior to their migration. Therefore, the actual harvest reduction needed to achieve the theoretical effect of flow augmentation is likely to be less than ½ of 1 percent.

Harvest reforms can provide significant benefit to the listed species, especially Snake River fall chinook. The RPAs listed for harvest in the Draft BiOp should be revised to require these reforms.

INCIDENTAL "TAKE" DOES NOT OCCUR FROM UPPER SNAKE PROJECTS

Operation of the Upper Snake BOR projects does not "take" listed salmon or steelhead. Without stating it directly, the Draft BiOp implies that operation and maintenance of these projects results in a "take" of listed Snake River salmon and steelhead. This is inherent in the "Incidental Take Statement" contained in the Draft BiOp (pp. 10–1 *et seq*). We strenuously oppose any conclusion that infers that Upper Snake BOR project operations result in a "take" under the ESA and therefore need to be authorized by NMFS.

Snake River salmon and steelhead habitat and the migratory corridor to the ocean are located far downstream of the Upper Snake BOR projects. These species have never existed above Milner Dam. The "take" that has occurred has been the result of downstream factors, as indicated in previous consultations on the Federal Columbia River Power System ("FCRPS"). The 1995 and 1998 Incidental Take Statements were for the FCRPS, not the Upper Snake BOR projects. In an attempt to mitigate the downstream impacts and pursue recovery of listed species, NMFS has required the BOR to provide 427 KAF from the Upper Snake River basin.

Given this relationship, NMFS properly concluded in the 1999 BiOp that the BOR's continued operation and maintenance of the Upper Snake projects will not jeopardize the continued existence of the species. It must be made equally clear that continued operation and maintenance of these projects will not result in any "take" of the listed species. This is a basic flaw in the Draft BiOp, which must be addressed.

MAGNUSON-STEVENS ACT RECOMMENDATIONS ARE PREMATURE AND FLAWED

Essential Fish Habitat (EFH) has not been designated for any of the listed species involved in the BiOp. Although EFH has been proposed for salmon and steelhead, the Secretary of Commerce has not yet acted. Thus. the analysis and recommendations on salmon habitat are premature.

The Magnuson-Stevens Act ("MSA") recommendations suffer from even greater deficiencies than the rest of the BiOp. First, the scope of the analysis is not clear. There is confusion as to whether the MSA recommendations are directed solely to FCRPS projects, or to the FCRPS and 29 additional BOR projects (compare Sections 12.2.1 and 12.3.1, pp. 12–5, 12–8). The rest of these comments assume that the Upper Snake BOR projects are included within the scope of the recommendations.

The Draft BiOp contains a litany of impacts from reservoir operations including changed streamflow conditions affecting turbidity and sediment transport, estuary conditions, seasonal flows, and the extent and characteristics of the Columbia River plume (pp. 12–8 through 12–11). Allegedly, these changes have led to migration delays, changes in water quality, new predator-prey dynamics, habitat impacts, and alteration of the distribution, abundance and diversity of organisms (Id.). Such broad statements require identification of the specific project creating those changes and the factual basis for such conclusions pertaining to that project. Like similar statements in the rest of the Draft BiOp, these conclusions cannot be substantiated

with established facts as to the Upper Snake BOR projects. Without specific reference to particular projects and substantiation of the facts for those projects, such broad generalizations should be deleted from the BiOp.

The EFH conservation recommendations adopt the RPAs in Section 9 of the Draft BiOp. For the reasons discussed under the section of these comments on Upper Snake Reasonable and Prudent Alternatives, those recommendations are flawed and should be eliminated in the BiOp.

REFERENCES

Anderson, J.J, R.A. Hinrichsen and C. Van Holmes. 2000. Effects of Flow Augmentation on Snake River Fall Chinook Attachment 3 to Evaluation of flow Augmentation proposals on the Snake River above Lower Granite Dam.

Arrington, Leonard J. 1986. Irrigation in the Snake River Valley. A Historical Overview. Idaho Yesterdays, Spring/Summer 1986, pp. 3–11.

Bonneville Power Administration, U.S. Bureau of Reclamation, and U.S. Army Corps of Engineers. 1999. Multi-Species Biological Assessment of the Federal Columbia River Power System. Submitted to the National Marine Fisheries Service and U.S. Fish and Wildlife Service, December 21, 1999.

DeHart, Michele, 1998. Memo from Michele DeHart, Fish Passage Center, to FPAC RE: Review—"Competing for the Mighty Columbia River—Past, Present and Future: The Role of Interstate Allocation" by Karl J. Dreher.

Dreher, Karl J. 1998. Competing for the Mighty Columbia River—Past, Present and Future: The Role of Interstate Allocation. Idaho Department of Water Resources, Boise, Idaho. April 30—May 1, 1998.

Ebel, Wesley J and Charles H. Koski, 1968. Physical and Chemical Limnology of Brownlee Reservoir, 1962–64. Fishery Bulletin: Vol. 67, No. 2, pp. 295–335. December 1968.

Hinrichsen, Richard A. 2000. Personal communication. September 2000.

Idaho Water Resource Board. 1996. Idaho State Water Plan. December 1996 (Ratif1ed by the Idaho Legislature March 1997). Boise, Idaho.

Marmorek, D.R. et al. (eds.). 1998. PATH Final Report for Fiscal Year 1998. ESSA Technologies Ltd., Vancouver, BC.

National Marine Fisheries Service (NMFS). 1995. "Basis for Flow Objectives for Operation of the Federal Columbia River Power System." Seattle, WA.

National Marine Fisheries Service (NMFS). 1999. An Assessment of Lower Snake River Hydrosystem Alternatives on Survival and Recovery of Snake River Salmonids, Appendix to the U.S. Army Corps of Engineers' Lower Snake River Juvenile Salmonid Migration Feasibility Study. April 14, 1999.

National Marine Fisheries Service (NMFS). 2000a. White Paper: Salmonid Travel Time and Survival Related to Flow in the Columbia River Basin. Northwest Fisheries Science Center, Seattle, Washington. March 2000.

National Marine Fisheries Service (NMFS). 2000b. Summary of research related to transportation of juvenile anadromous salmonids around Snake and Columbia river dams. Northwest Fisheries Science Center, National Marine Fisheries Service Seattle, Washington. April 2000.

National Marine Fisheries Service (NMFS). 2000c. Excel 97 spreadsheets with details of the species-level analyses described in sections 6.3., 9.7.2, and 9.7.3.2. <http://www.nwr.noaa.gov/I salmon/salmesa/fedrec.htm>.

National Marine Fisheries Service (NMFS). 2000d. Biological Opinion. Appendix C. August 30 Draft. <http://www.nwr.noaa.gov/1hydrop/hydroweb/docs/2000/appendc.pdf>.

Norris J. G. 2000. Defining Equivalent Harvest Reduction Policies for Endangered Salmon Stocks. Sustainable Fisheries Management: Pacific Salmon. Editor Knudsen et al.

Norris. J. G. 1995. A Simple Spreadsheet Model for Evaluating Recovery Strategies for Snake River Fall Chinook Salmon Fisheries Research Institute. University of Washington, Seattle, WA http://www.cbr.washington.edu/papers/global.pdf)

Northwest Fisheries Science Center. 2000. White Paper: Salmonid Travel Time and Survival Related to Flow Management in the Columbia River Basin. Seattle Washington. March 2000.

NPPC (Northwest Power Planning Council). 1994. "Columbia River Basin Fish and Wildlife Program." Portland, OR.

NRC (National Research Council). 1995. Upstream: Salmon and Society in the Pacific Northwest. Committee on Protection and Management of Pacific Northwest Anadromous Salmonids, Board on Environmental Studies and Toxicology, Commission on Life Sciences.

Peters, C.N. et al. 1999. PATH Decision Analysis Report for Snake River Fall Chinook. ESSA Technologies Ltd., Vancouver, BC.

U.S. Army Corps of Engineers. 1995. Columbia River System Operation Review Final Environmental Impact Statement. North Pacific Division.

U.S. Bureau of Reclamation. 1999. Snake River Flow Augmentation Impact Analysis Appendix. Lower Snake River Juvenile Salmon Migration Feasibility Study and Environmental Impact Statement. February 1999.

U.S. Bureau of Reclamation. 1999. Biological Opinion: Bureau of Reclamation Operations and Maintenance of its Projects in the Snake River Basin Above Lower Granite Dam: A Supplement to the Biological Opinions Signed on March 2, 1995, and May 14, 1998. Endangered Species Act Section 7 Consultation conducted by National Marine Fisheries Service, Northwest Region. December 9, 1999.

U.S. Census. 1910. Census of Agriculture, Part II, Crops and Irrigation. U.S. Census Office.

ATTACHMENT 1: COMMENTS ON FLOW WHITE PAPER AND REPLY TO NMFS RESPONSES

In many instances, the revised White Paper[21] is substantially improved over the September 1999 draft. Some of the discontinuity between the analysis of the data and the conclusions has been eliminated and many of the uncertainties in the relationship of flow to survival have been clarified. However, the Idaho water users still take issue with a number of items in the White Paper and disagree with some of the NMFS responses to our comments on the draft. Moreover, the discontinuity that previously existed within the White Paper now exists between the Draft BiOp and the White Paper, i.e., the Draft BiOp makes much stronger assertions of "fact" than does the White Paper, yet the Draft BiOp purports to rely on the White Paper's analysis.

One general comment is worth noting at the outset. We have made a concerted effort to direct our comments on the White Paper and the Draft BiOp only to flow augmentation from the *Upper Snake River*. The reciprocal is not true. The White Paper and Draft BiOp generally lump flow augmentation from all sources into the same analysis. Upper Snake flow augmentation must be considered separately from Dworshak's cool water releases and separately from the enormous volumes of water available from mainstem Columbia River reservoirs.

Many of our issues are addressed in the body of our comments on the Drati BiOp and will not be repeated here. Other comments on the final White Paper remain the same as those on the draft and are simply referenced here. The following comments follow the order of the items in the White Paper.

INTRODUCTION

We appreciate the recognition that "storage regulation changes are less pronounced in the lower Snake River than in the Columbia River" (p. 1).[22] We also agree that Snake River fall chinook "are particularly susceptible to changes in the thermal regime and they spawn and rear in the mainstem" (p. 2). However, juvenile migrant mortality is also sensitive to temperature (Anderson et al, 2000).

The discussion of how the dams are operated to attempt to meet the seasonal flow objectives is not applicable to flow augmentation from Idaho. The reservoirs in Idaho are drafted in the late spring and summer, not "primarily through limiting winter drafting and rates of reservoir refill." Particularly for the Upper Snake reservoirs, water used for flow augmentation has typically been stored to meet authorized purposes and would be used elsewhere if not released for flow augmentation—it is not simply a matter of adjusting the rate of outflow.

PHYSICAL PROPERTIES OF WATER AFFECTED BY FLOW

In our comments on the draft White Paper, we made a number of comments concerning the need for additional hydrological background and analysis in the White Paper. The response was as follows:

Our Original Comments (excerpts selected by NMFS): "Flows from the upper Snake Basin are virtually the same as they were 85 years ago." IWUA p. 3 ". . . the flow quantity [from] the Snake River has not changed significantly over the past 85 years. Thus any changes [to] the estuary or . . . plume are not the result of up-

[21] White Paper: Salmonid Travel Time and Survival Related to Flow Management in the Columbia River Basin, Northwest Fisheries Science Center, Seattle, Washington, March 2000.

[22] In this attachment, page references refer to the White Paper unless otherwise noted.

stream development on the Snake River. Further, the [Snake River] flows required to make significant changes in the estuary . . . are large . . .'' IWUA p. 4 ''The White Paper should be substantially revised to incorporate a comprehensive review and discussion of the hydrology of the Snake and Columbia Rivers. Particular emphasis should be placed on the Snake River system where populations of the listed species of most concern are located.''

NMFS Response: We concur that a better understanding of hydrology would be helpful. We did expand Table 1 to indicate how flows have changed over time in the Snake and upper Columbia Rivers. However, hydrology is not the focus of this paper. The focus is on studies that measure the reaction of salmonid populations to variable environmental conditions. We also need to dispel the notion that the Snake River stocks are of most concern. Eight other salmonid ESUs are listed as endangered or threatened in the Columbia River Basin. Upper Columbia stocks are worse off than Snake stocks (excluding Snake River sockeye salmon) according to the latest CRI extinction analyses. Further, flow from the Snake River itself, though, is not the only important factor for salmon survival; water velocity and temperature are also important. These factors have changed drastically as a result of development of the hydropower system, including on the Snake River above the confluence with the Clearwater (Ebel and Koski 1968). Although flows in the Snake River have not changed, travel time of migrants has increased significantly due to the development and operation of the hydropower system.

Our Reply: While we understand that the White Paper focuses on biological response to environmental conditions, a more thorough understanding of the environmental variables would assist in interpretation of the data. For example, the fact that flows from the Upper Snake River have not decreased over time and summer flows have increased should be a consideration when evaluating which of the variables may be the most important to the listed species, especially when all of major variables are highly correlated with each other.

We also understand that the Snake River stocks may not be of the ''most concern'' to NMFS. However, we still believe that a more comprehensive review and discussion of the Snake River hydrology is warranted given that much of the biological research on flow-survival has been conducted on the Snake River. Moreover, given the relatively small amount of storage in the Snake River basin in comparison to the entire Columbia basin. flow augmentation from the Snake River primarily has the potential to affect the lower Snake, not the lower Columbia. Thus. Upper Snake flow augmentation has little or no impact on the ''worse off'' Upper Columbia stocks.

We also agree that temperature is important. However as discussed in the main body of comments on the Draft BiOp, summer flow augmentation from the Upper Snake typically leads to warmer water downstream, not cooler. In the case of flow augmentation from the Upper Snake River, the dampening of temperature increases from increased volume that is described in the White Paper (p. 5) is overwhelmed by ambient air temperature.

While we believe that the relationships of survival to velocity and flow to travel time are unproven, flow augmentation can do little to alter velocity and travel time because of the enormous increase in cross-sectional area created by the mainstem dams.

Another NMFS response to this area of comment requires a reply:

Our Original Comment: ''. . . flow augmentation is futile to mitigate the velocity reduction due to dams on the lower Snake River . . . More than 160 MAF would be required to restore pre-dam velocities.''

NMFS Response: Nowhere in the white paper is the unrealistic goal of affecting pre-dam water velocities through reservoirs considered. Also, flow augmentation can be used for purposes other than increasing water velocity, such as temperature regulation, decreased delay at dams, and increased spill. Additionally, each incremental improvement in flow helps to return the river to a more normative condition. The incremental effects of water withdrawal throughout the system have also changed the hydrology of the river from conditions under which the fish evolved.

Our Reply: Assuming that the response means that the White Paper does not suggest that the goal is to achieve pre-dam velocities, we acknowledge that no velocity goals are set forth. The purpose of citing the amount of water that it would take to achieve pre-dam velocities is to put the magnitude of the futility to significantly alter velocities in perspective. The White Paper does suggest that a link between velocity, travel time, and survival exists. Our point is that flow augmentation from the Upper Snake makes a minuscule difference in velocity.

Similarly, Upper Snake flow augmentation makes a minuscule difference, if any, to temperature regulation, decreased delay at dams, increased spill, or estuary and plume conditions. In fact, as discussed in the main body of comments on the Draft

BiOp, summer flow augmentation from the Upper Snake is detrimental to Snake River fall chinook.

The argument that flow augmentation is needed to increase spill is particularly perplexing because the fraction of the liver spilled during low and moderate flow conditions (when flow augmentation might be used to increase flows) depends on an operational decision. not the total flow in the river. In other words, the percentage of spill is independent of flow augmentation from the Upper Snake River.

There is no evidence that water withdrawals from the Upper Snake have had a significant incremental effect on the listed species or their habitat, or on "normative" conditions in the river.

EFFECTS OF RIVER FACTORS—SPRING MIGRANTS

Our primary views on the effect of flow on spring migrant survival are set forth in the main comments on the Draft BiOp. However, our replies to NMFS responses on this issue are set forth below:

Our Original Comments: "In recent years, the Raymond and Sims and Ossiander research has been discounted . . . However, the studies criticizing the dated research are not even discussed or cited in the White Paper."

". . . older research that does not consider changes in the hydrosystem over time . . . is still relied upon."

NMFS Responses: We don't use data from any of these studies to support our conclusions, therefore we do not make any effort to criticize these data.

Wherever possible, we updated past analyses of SAR or recruit-per-spawner data. Furthermore, the white paper relies mostly on the recent PIT tag data, collected under current conditions.

Our Reply: We are encouraged to hear that NMFS is no longer relying extensively on dated research.

Our Original Comment: ". . . photoperiod provides a better basis to predict travel time [of Snake River spring chinook salmon] than flow . . ."

NMFS Response: "This conclusion is based on an *ad hoc* analysis (comparing mean R_2 values) that would not measure up to scientific scrutiny. We do acknowledge that smoltification level (for which photoperiod is likely a surrogate) is important in determining migration rate, and we elaborate on this point in the new version of the white paper. This does not diminish the fact no study has *failed* to find a travel time/flow relationship for Snake River spring chinook salmon."

Our Reply: The literature presents diverse interpretations of observational data on variables which are observed to be statistically associated with the migratory behavior of juvenile salmonids. Statistical correlation between and among random variables is useful for making predictions and evaluating hypotheses. Like NMFS, we recognize that correlation is not causation. Controlled experiments are typically required to identify cause and effect relationships. In the case of the multiple variables that are related to flow, because the wide natural variation in those variables and the lengthy life-cycle of the listed species. controlled experiments are not likely to provide useful information in a reasonable amount of time. Thus, all interested parties must engage in ad hoc analysis, NMFS included. In such a case, it is even more important to focus on the ecological mechanisms that might explain correlations.

The onset and synchronization of smotification and migration to sea are regulated by environmental variables—primarily increasing day length and temperature. These exogenous factors operate after juvenile salmonids attain a threshold size. Smotification and migration to sea typically occur during a limited span of time, which is highly predictable and closely related to cyclical changes in day length (photoperiod) and water temperature. Temperature mediates the physiological response to photoperiod—inhibiting smotification at cooler temperatures and stimulating smotification at warmer temperatures. Other environmental factors such as lunar periodicity, barometric pressure, water turbidity and velocity, wind, and spring overturn in lacustrine waters may modulate migration activity within a given seasonal cycle.

In other words, statistical associations between smolt migration speed or "survival" and flow may be coincidental where variables exhibit collinearity or multiple collinearity. As discussed in our primary comments on the draft BiOp, flow, temperature, photoperiod, turbidity, and velocity are all collinear. It is incumbent on NMFS to look beyond simple correlations of flow and survival in order to examine the ecological implications of environmental vanables.

In our original comments, we list studies that have failed to find a travel-time/flow relationship. For example, Skalski (1998) concludes that even though environ-

mental variables fluctuate greatly, survival of cohorts of PIT-tagged juveniles released daily at Lower Granite Dam exhibit little change throughout the migration period.[23] He found survival between Lower Granite and Little Goose Dam tailraces to be ". . . remarkably stable over the course of the season" and observed no association between survival and daily flow or daily spill. Such studies are simply omitted from the White Paper and from the NMFS response to our comments.

EFFECTS OF RIVER FACTORS—SUMMER MIGRANTS

Extensive comments on the flow augmentation-survival issue for fall chinooks are set forth in the main body of comments on the Draft BiOp. Our replies to the NMFS responses to our comments on the draft White Paper and those of other commenters on are provided below:

Our Original Comment: "Particularly troubling is the suggestion that temperature control he used to more closely approximate historical conditions. Most scientists caution against taking actions based simply on how closely they approximate pre-dam environment . . . In the pre-dam system, the vast majority of the fall chinook in the upper Snake River spawned above Brownlee Dam . . ." and "Another issue is that the existing outlet works from the dams in Hells Canyon are mid-elevation facilities. Although an extremely expensive retrofit of multi-level outlet works might be technically possible, it is not clear that the pool behind Brownlee Dam has significant temperature stratifications year-round."

NMFS Response: We concur simply flying to mimic historical conditions is naive. The goal is to restore threatened and endangered salmonid populations. As noted elsewhere, hydroelectric development in the upper Snake River has severely affected populations of fall chinook salmon to the point that their major freshwater habitat has changed. Returning to historical conditions is not relevant for these fish. However, previous research has shown that changes in water temperatures have changed the timing of fall chinook salmon spawning in the Snake River. Subsequent emergence of fry and growth is also delayed, in turn delaying the start of downstream migration. The later the fish migrate, the worse the passage conditions. Changes in temperature regimes from present conditions might lead toward more favorable conditions and higher survival of fall chinook salmon. Ebel and Koski (1968) showed that Brownlee Reservoir is highly temperature-stratified beginning in May.

Our Reply: Beneficial changes in the temperature regime are unlikely to result from Upper Snake flow augmentation. Regardless of the stratification of Brownlee. ambient air temperature plays a significant role in river temperatures downstream of Hells Canyon. As noted in our primary comments on the Draft BiOp, Ebel and Koskis study also shows that Upper Snake flow augmentation is detrimental to fish under some conditions.

Original Comments: "There are a series of factors that potentially interact to determine the effect of flow on survival . . ." Bouwes *et al.* p. 14 ". . . survival estimates were [not] used as a dependent variable in multiple regression; i.e., the combined or interacting effects of flow, spill, turbidity, and temperature were not examined as predictors of survival rate." Bouwes et al. p. 19 ". . . environmental variables act in concert and affect survival rates in biologically meaningful ways." USFWS p. 3.

NMFS Response: We concur that there is potential for environmental factors to interact in their effects on survival. Multiple regression, particularly with interaction among independent variables, might improve model fits. However, in cases where univariate regressions over a number of years yield no significant relationships (e.g. regressions with Snake River spring migrants comparing survival estimates to flow exposure), we consider it doubtful that a multiple regression approach would uncover any new information. In the case of Snake River fall chinook salmon, with regressions of survival from release to Lower Granite on flow, temperature and turbidity exposure indices, the environmental variables are so highly correlated that a multiple regression analysis is highly unlikely to determine which factors are most important in determining survival. Nonetheless, we intend to explore multiple regression approaches in future analyses of these data. The only way to demonstrate some of these effects with a high degree of confidence is to conduct controlled experiments. Unfortunately, it is extremely difficult to define control and treatment groups that only differ in a treatment (such as flow augmentation). Within-season treatments would be difficult to conduct because of the protracted migrations of re-

[23] Skalski, J.R. 1998; Estimating season-wide survival rates of outmigrating salmon smolt in the Snake River, Washington. Can. J. Fish Aquat. Sci. 55:761–769.

lease groups. Year-to-year treatments would require many replications due to confounding effects. With these limitations in mind, we are required to use the best available information, which, at this point in time, is the results of survival studies. In the future, it may be possible to manipulate the system to limit the confounding effects of correlated variables.

Our Reply: We agree that multiple regression will not help the analysis of spring migrant relationships to environmental variables. With respect to fall chinook, we encourage you to replicate the analysis performed by Anderson et al. (2000) which rejected flow as a predictor variable. As noted above in these replies. controlled experiments are unlikely to provide relevant information in a timely manner.

Our Original Comment: ". . . benefits of flow are justified with phrases like 'data indicate,' 'would likely' and 'may provide.' Clearly these qualitative and subjective phrases are used because a relationship between flow and survival has not been quantified, nor is it likely to be quantified."

NMFS Response: In ecological studies, it is rare that one can be certain beyond a doubt about any conclusion. Scientific judgment involves accumulating information through time and determining which conclusions are supported by the preponderance of evidence. It would be unfair to characterize something as certain when it is not. At the same time, lack of 100 percent certainty does not indicate that relationships do not exist. It is clear that salmon migrating downstream through the hydropower system do so under flow conditions that are different than those under which they evolved. This is particularly true once the fish get below Bonneville Dam Suggesting more natural flows are better for fish is not inconsistent. It is not the role of science to make the management decision of when the costs of flows are too high to outweigh presumed benefits for the fish.

Our Reply: The "preponderance of the evidence" does not support Upper Snake flow augmentation. We agree that salmon are migrating downstream under altered flow conditions. However, we maintain that Upper Snake development had little or nothing to do with those changed conditions and Upper Snake flow augmentation will not significantly improve conditions downstream, particularly below Bonneville Dam. It is also not the roll of science to rely on platitudes such as "if some water is good. more is better." The ESA requires a scientific analysis from scientists, not a subjective analysis that "natural" is better.

Our Original Comments: ". . . there does not appear to be a relationship between travel time and survival [for Snake River fall chinook salmon]. This strongly indicates that other river conditions . . . may be more important to survival than simply the quantity of flow" ". . . there is credible and important scientific evidence that temperature is the operative variable affecting survival, not flow."

NMFS Response: The highly speculative nature of these comments is ironic given your criticism to NMFS for speculative conclusions. Alternative explanations should be held to the high standards you demand of NMFS. We discuss the effect of temperature and flow and provide text on potential effects of both on survival in the final White Paper.

Our Reply: We stand by our original comments. NMFS is in a poor position to criticize commenters for speculative suggestions when the comments are merely pointing NMFS to studies that do not support their conclusions. Under the ESA, an agency must consider all scientific evidence, not brush aside criticisms that disagree with NMFS conclusions as "equally speculative." NMFS has no license to speculate in developing its biological opinion. As set forth in our main comments on the Draft BiOp, we believe that our interpretations are supported by sound science and reasonable ecological mechanisms.

Our Original Comment: "Although flow and survival exhibit a positive and linear relationship at low flows . . ., the relationship is flat above 120 kcfs. . . . This is a strong indication that whether the relationship is correlative or causative, it breaks down."

NMFS Response: Our analyses contained in the white paper conclude that above 120 kefs, the relationship between survival and flow flattens out. Nonlinear relationships and threshold phenomena in biology are very common. To say that the relationship "breaks down" because it is not strictly linear through its entire range is speculative. Further, most flow augmentation will occur at background flows below 120 kefs. We also provide text discussing how high flows (in 1997) were probably detrimental to survival by flushing rearing parr out of the system before they were ready and increasing the debris load at the dams.

Our Reply: We believe that the issue of whether the relationship "breaks down" is moot. As discussed in the primary comments on the Draft BiOp, further research

using multiple regression indicates that there is not a statistically-sound relationship between flow and survival.

Our Original Comment: ". . . the White paper reports an investigator's [Connor et al. 1998] conclusions without noting fundamental problems with the research."

NMFS Response: We reported results from a peer-review[ed] journal article and attributed the conclusions about the potential of flow augmentation to improve survival to the authors. Disagreements with scientific articles are properly addressed by writing a rebuttal article, submitting it to the journal for peer review, and having it published.

Our Reply: The purpose of the White Paper is to recommend policies for NMFS to use for management of the Columbia River ecosystem. The White Paper was obviously heavily relied upon in drafting the BiOp. To cite Connor et al. without comment or qualification suggests that the authors and NMFS endorse the conclusions. Simply because something survives peer review is no guarantee that it is relevant, accurate or sound. NMFS has a duty to critically examine all data submitted to it, to examine it for methodological flaws that might bias its outcome rather than to accept every published article. Surely NMFS does not suggest that it will automatically reject every disagreement with a scientific article that is not peer reviewed or published in a journal? Or, on the other hand, automatically accept any scientific article that is peer reviewed and published in a journal?

ATTACHMENT 2: EXCERPT FROM BOR-TWIN FALLS CANAL COMPANY CONTRACT

UNITED STATES DEPARTMENT OF INTERIOR, BUREAU OF RECLAMATION, MINIDOKA AND PALISADES PROJECTS, IDAHO—CONTRACT WITH TWIN FALLS CANAL COMPANY (CONTRACT NO. 14–06–W–60)

RE: CONCERNING STORAGE CAPACITY IN AMERICAN FALLS, JACKSON LAKE, AND PALISADES RESERVOIRS, AND RELATED MATTERS

THIS CONTRACT, Made this 13th day of May 1954, pursuant to the Federal Reclamation Laws, between THE UNITED STATES OF AMERICA (hereinafter called the United States), acting through the Assistant Secretary of the Interior, and TWIN FALLS CANAL COMPANY (herein after called the Company), a corporation organized and existing under the laws of the State of Idaho and having its principal place of business at Twin Falls, Idaho,

Witnesseth, That:

2. WHEREAS, the United States, under the Federal Reclamation Laws, has heretofore constructed and is now operating Jackson Lake, Island Park, American Falls, and Lake Walcott reservoirs, among others, and is now constructing Palisades Dam and Reservoir Project (herein called the Palisades project);

3. WHEREAS, the Company desires to cooperate with the United States and the various other water users organizations that enter into like contracts in the water conservation program that will be made possible with the construction of Palisades Reservoir and its operation in conjunction with the construction of Palisades Reservoir and its operation in conjunction with other Federal reservoirs on the Snake River, as herein proposed; and

4. WHEREAS, the United States, the Company, and the Kuhn Irrigation and Canal Company have heretofore entered into a contract dated February 25, 1913 (Symbol and No. I1r-494) with respect to storage rights in Jackson Lake Reservoir (hereinafter called the contract of February 25, 1913, Symbol and No. I1r-494);

NOW, THEREFORE, in consideration of the mutual and dependent covenants hereinafter stated, it is hereby agreed between the parties hereto as follows:

DEFINITIONS

5. The following terms, wherever used in this contract, shall have the following respective meanings:

"Secretary" shall mean the Secretary of the Interior or his duly authorized representative.

"Federal Reclamation Laws" shall mean the Act of June 17, 1902 (32 Stat. 388) and acts amendatory thereof or supplemental thereto, including the Act of September 30, 1950 (64 Stat. 1083).

"Advisory Committee" shall mean the committee defined by article 29 of this contract or its duly authorized representative.

"Irrigation season" shall mean a period of each year beginning April 1 and ending October 31 of that year.

"Storage season" shall mean, with respect to the reservoir involved, the period beginning October 1 of one year and ending during the next year when, as to the particular reservoir, no more water is available for storage.

"Reservoir system" shall mean the existing and authorized Federal reclamation reservoirs on the Snake River and its tributaries down to and including Lake Walcott.

"Upper valley" shall mean the irrigated areas of the Snake River Basin that are served by canals diverting from the Snake River and its tributaries above American Falls Dam.

"Lower valley" shall mean the irrigated areas of the Snake River Basin that are served by canals diverting from the Snake River and its tributaries between American Falls Dam and Milner Dam.

"Watermaster" shall mean the officer of the State of Idaho charged by law with the distribution of Snake River water in the lower and upper valleys, or such other officer properly authorized by law and designated by mutual agreement of the Secretary and the Advisory Committee.

PROVISIONS RELATING TO STORAGE CAPACITY IN AMERICAN FALLS RESERVOIR (ARTICLES 6 THROUGH 8)

STATUS OF COMPANY'S RIGHTS UNDER PRIOR AMERICAN FALLS RESERVOIR DISTRICT CONTRACT

6. Lands lying under the canals of the Company are entitled to receive water under rights created by the contract between the United States and the American Falls Reservoir District, dated June 15, 1923, as amended (Symbol and No. I1r-168), but neither that contract nor any rights or obligations thereunder is intended to be altered in any respect by this contract.

ADJUSTMENT FOR COMPANY'S SHARE OF NET LEASING REVENUES

7. (a) Of the net leasing revenues creditable to the 315,000 acre-feet of reserved American Falls space, as of December 31, 1951, determined by the Secretary in accordance with the provisions of section 3 of the Act of September 30, 1950, seventy-three thousand seven hundred seventy-three dollars and fourteen cents ($73,773.14) would have been available to the Company for application on the construction charge obligation for American Falls reserved space which the Company might have acquired. In consideration of the fact that no such reserved space is being made available to the Company by this contract, the Company's share of the credit being applied against the construction charge obligation of the reserved space made available to others purchasing such space, each entity so purchasing shall be required, as a condition to such purchase, to contract to pay to the United States an amount equal to its share of the Company's credit which accrues to it.

(b) The amounts received by the United States shall be paid to the Company, to the extent authority therefore is available, not less often than once each year, or shall be credited once each year on obligations then due or thereafter next to become due from the Company to the United States in connection with the reservoir system, but no liability shall . . . which provision for payment for the Company's share is made elsewhere in this contract. The amount apportioned to American Falls Reservoir shall be distributed equally over all space available for irrigation storage, excluding the lower valley exchanged space but including in lieu thereof the upper valley exchanged space in Jackson Lake Reservoir.

(f) If the owners of any storage rights to benefit from the operation of this article fail to obligate themselves for their share of the annual payments for power replacement hereunder, the saved water creditable to such rights and the power replacement costs chargeable thereto shall be redistributed according to a formula to be agreed on in writing between the Advisory Committee and the Secretary. Such formula shall, however, be as nearly consistent as practicable with the formula that would control but for such redistribution.

PROVISIONS OF GENERAL APPLICATION TO ALL RIGHTS ESTABLISHED OR DEFINED BY THIS CONTRACT (ARTICLE 14 THROUGH 37)

TEMPORARY STORAGE AND EXCHANGE OF WATER; RELEASE OF JACKSON LAKE AND PALISADES WATER FOR POWER PRODUCTION

14. (a) It is the purpose of the United States and the water users having storage rights in the reservoir system (including the Company) to have the reservoir system so operated as to effect the greatest practicable conservation of water. In keeping

with this purpose, the endeavor will be to hold stored water in reservoir system space that is farthest upstream. Water in storage in any of the reservoirs of the system may, however, when the watermaster and the Advisory Committee determine this to be in the interest of water conservation, be held temporarily in unoccupied space in any other reservoir of the system. And the Company hereby consents to the making, with the approval of the watermaster, of annual exchanges of stored water among the various reservoirs of the system. No such temporary holding of water or such annual exchanges shall, however, deprive any entity of water accruing to space held for its benefit.

(b) During any storage season, the United States, after consultation with the Advisory Committee, may release stored water from Jackson Lake reservoir for the maintenance of power production at Palisades dam powerplant and may store such water, as Jackson Lake water, in American Falls Reservoir. The release of such water will be confined, however, in storage seasons when it appears that American Falls, Palisades, and Jackson Lake reservoirs will fail to fill, to water required for the maintenance of a minimum firm power production (estimated to be about 11,000,000 kilowatt-hours per month at an average production of 15,000 kilowatts) and which can be stored in American Falls Reservoir; and no such release shall be made that will preclude the later delivery of water, by exchange or otherwise, to the upper valley entities entitled thereto.

RENTAL OF WATER; SALE OF SPACE

15. (a) The Company may rent stored water which has accrued to its credit in any reservoir of the system, but such rentals shall be for only one year at a time and at rates to be approved in advance by the Secretary and the Advisory Committee. Rates shall not exceed the annual costs under the Company's obligations to the United States which are properly . . . .

ATTACHMENT 3: RÉSUMÉS OF CONTRIBUTORS

JAMES J. ANDERSON

Columbia Basin Research; 1325–4th Ave., Suite 1820, Seattle, WA 98101; Phone: 206–543–4772; Fax: 206–616–7452; Email: jim@cbr.washington.edu; Web: http// www.cbr.washington.edu/~jim

Appointment

Associate Professor (WOT), School of Fisheries, College of Ocean and Fisheries Sciences, University of Washington, Seattle, Washington 98195; Director, Columbia Basin Research, Columbia Basin Research, 1325–4th Ave., Suite 1820, Seattle, WA 98101

Previous Appointments

Research Associate Professor, College of Ocean and Fishery Sciences. UW (1987–91)

Research Assistant Professor, College of Ocean and Fishery Sciences, UW (1983–87)

Research Associate, College of Ocean and Fishery Sciences, UW (1981–1982)

Visiting Scientist, Dept. of Biophysics, University of Kyoto, Japan (1981)

Visiting Scientist, National Institute of Oceanology, Ambon, Indonesia (1980–1983)

Visiting Scientist, Institute of Oceanographic Sciences, Wormley, England (1980)

Adjunct Assistant Professor, Marine Sciences Research Center, State Univ. of New York (1977–1980)

Principal Oceanographer, Fisheries Research Institute, UW (1979–80)

Oceanographer Dept. of Oceanography, University of Washington (1969–1979)

Research Interest

Biomathematics ecology, fisheries, oceanography, toxicology, fish protection at power plants, fish passage and life cycle modeling, animal and human behavior, decision processes, ecosystem modeling, fisheries decision support models for fish/hydropower interaction.

Recent Research

Hydro Project: Developing computer for management of Columbia River hydroelectric and fisheries agencies. The work involves building models and analyzing data on the migration and survival of salmon through the Columbia River system (CRiSPI) and the harvest of fish in the ocean and rivers (CRiSP2). The projects

maintains computer models and data base information accessible through the World Wide Web. The model are being used to assess management strategies for hydrosystem operations and fisheries management.

Model development has involved original work on fish migration and survival. A number of student thesis and dissertations have been developed through the project including a dissertation on fish migration (Zabel 1994). a dissertation on fitness in salmon life history strategies (Hinrichsen 1994), a thesis of optimum strategies for salmon (Beer 1996), effect of ocean conditions on early ocean survival of chinook salmon (Hyun 1996).

The model incorporates upstream adult migration, nearshore and estuary affects on juvenile salmon survival, and improved modeling of the impact of supersaturation on fish survival.

PATH Project: Participation in Plan for Analyzing and Testing Hypotheses (PATH) to evaluate the Snake River endangered species recovery plans.

DART Project: Providing public data integration to the public for more effective access, consideration, and application as well as participating in a regional information review and making recommendations to BPA.

U.S. Army Corps of Engineers Project: Developing analysis and computer models for the impact of gas bubble disease on migrating salmon. Analyzing the impact of reservoir drawdown on passage and survival of adult and juvenile salmon.

National Marine Fisheries Service Project: Under this project a general fisheries lifecycle harvest model is being developed. It is anticipated that this model will be the foundation of salmon and possibly ground fish management models in the next decade. The model will be used in the salmon co-management activities and in evaluating impacts of human activities on endangered species.

Professional Memberships

- Sigma Xi
- American Fisheries Society
- Resource Modeling Association

Workshop and Conference Organization Activities

Organization committee for the Bonneville Power Administration Predator/Prey Workshop, Friday Harbor Laboratories, May 1989.

Coordinator of the Bonneville Power Administration Survival Workshop, Friday Harbor Laboratories, Feb. 1989.

Session chairperson at the Conference on Fish Protection at Stream and Hydro-Power Plants Sponsored by Electric Power Research Institute, Oct. 1987.

Coordinator for Ecological Risk Assessment Workshop University of Washington, July 1987.

Session chairperson at the Saanich Inlet workshop, Sydney British Columbia, Feb. 1983.

Public Service

Toured Tri-Cities, Walla Walla and Yakima with President Richard McCormick, 1998.

Provided analysis and advice to the Snake River Endangered Species Recovery Team, 1995.

Associate Editor North American Journal of Fisheries Management, 1989–1990.

University of Washington, Saturday Alumni Lectures, Autumn 1989.

Puget Sound water quality planning committee, ad hoc committee on nutrient studies, Mar. 1987.

University Task Force on Salmon and the Columbia River System—represent the UW in a group of faculty from the University of Idaho, Oregon State University, Washington State University and University of Washington with interests and expertise relating to the Columbia River system.

• Ravenna Creek Feasibility Study—joined with representatives of neighborhoods adjacent to Ravenna Creek and members of the Department of Landscape Architecture to consider the possibility of daylighting the creek from its source to Portage Bay and possible restoration of its salmon run.

• Provide testimony on salmon restoration at 19 hearing including U.S. Senate and House subcommittees and State (Oregon, Idaho, Washington) committees between 1995 and 2000.

Reviewer

- EPA Environmental Biology Review Panel
- NSF Biological Oceanography, Physiological Processes
- U.S. Geological Survey
- Natural Environmental Research Council, Great Britain

- EPA Cooperative research programs
- NSF Psychobiology
- Research and Evaluation Associates, Inc.
- Bonneville Power Administration to technical work group
- NSF Physiological Process section
- Oregon Coastal Salmon Restoration Initiative
- NMFS Endangered Species Act review process for permit applications
- Various Scientific Journals

Expert Witness

Federal Energy Regulatory Commission Court—certified as a fisheries expert on issues of fish migration and dam passage

Honors and Awards

College of Ocean and Fishery Sciences Distinguished Research Award 1996

Research is included in the UW publication Pathbreakers: A century of Excellence in Science and Technology at the University of Washington (1997)

Nomination for Computerworld Smithsonian Awards in programming for the CRiSP computer model, 1993

Special Recognition for participation in the U.S. Fish and Wildlife Service Fish Passageways and Division Structures course in 1990

Research Faculty Fellowship, College of Ocean and Fishery Sciences 1989

Research Faculty Fellowship, College of Ocean and Fishery Sciences 1985

Selected Publications

Norris, J.S. Hyun, J.J. Anderson (in press) Ocean Distribution of Columbia River Upriver Bright Fall Chinook Salmon Stocks.

Steel, E.A., P. Guttorp, J.J. Anderson and D.C. Caccia. (In press). Modeling juvenile migration using a simple Markov chain. Journal of Agricultural, Biological and Environmental statistics.

Anderson, J.J. 2000. A vitality-based model relating stressors and environmental properties to organism survival. Ecological Monographs 70(3) 117–142.

Anderson, J.J. 2000. Decadal climate cycles and declining Columbia River salmon. In Proceedings of the Sustainable Fisheries Conference, Victoria, B.C., ed. E. Knudsen. American Fisheries Society Special publication no. 2x. Bethesda, MD. 467–484.

Helu, S.L., J.J. Anderson, D.B. Sampson. 1999. An individual-based fishery model and assessing fishery stability. Natural Resource Modeling. 12(2) 213–247.

Zabel, R.W., J.J. Anderson, and P.A. Shaw. 1998. A multiple reach model describing the migratory behavior of Snake River yearling chinook salmon (Oncorhynchus tshawytscha). Canadian Journal of Fisheries and Aquatic Sciences: 55:658–667.

Beer, W.N. and Anderson, J.J. 1997. Modelling the growth of salmonid embryos. J. Theor. Biol. 189, 297–306.

Zabel, R. and J.J. Anderson. 1997. A model of the travel time of migrating juvenile salmon, with an application to Snake River spring chinook salmon. North American Journal of Fisheries Management, 17:93–100.

Anderson, J.J. 1996. Review of the influence of climate on salmon. In Plan for Analyzing and Testing Hypotheses (PATH): Final report on retrospective analyses for fiscal year 1996. Compiled and edited by ESSA Technologies Ltd., Vancouver, B.C.

Nemeth, R. and J.J. Anderson, 1993. Response of juvenile salmon to light. North American Journal of Fisheries Management. 12:684–692.

Anderson, J.J. 1992. A vitality-based stochastic model for organism survival. In Individual-Based Models and Approaches in Ecology: Populations, Communities and Ecosystems. Editors DeAngelis and Gross. Chapman Hall, New York. p. 256–277.

Anderson, J.J. 1991. Fish Bypass System Mathematical Models. WATERPOWER 91, Proceedings of the International Conference on Hydropower. July 24–26, 1991 in Denver, Colorado.

Ostrander, G.K., J.J. Anderson, J.P. Fisher, M.L. Landolt and R.M. Kocan. 1990. Decreased performance of rainbow trout emergence behaviors following exposure to benzo(a)pyrene. Fishery Bull. 88:51–55.

Anderson, J.J. 1988. Diverting migrating fish past turbines. The Northwest Environmental Journal 4:109–128.

Anderson, J.J. 1988. A neural model for visual activation of startle behavior in fish. Journal of Theoretical Biology. 131:289–305.

Anderson, J.J. and A.H. Devol. 1987. The extent and intensity of the anoxic zone of basins and fords. Deep-Sea Research 34:927–944.

CRAIG L. SOMMERS

Water Resource Specialist

Craig is president of ERO Resources Corporation with over 20 years of consulting experience in land and water resources planning and evaluation. He serves as manager and lead scientist or economist on a wide variety of projects.

Some of Craig's experience includes: technical coordination in complex litigation, water rights and water resource evaluations, resource economics, soil surveys, arable land classification, land use planning, and agronomy.

Education

M.S., 1977, Agricultural Economics (Emphasis in Water Resources), University of California, Davis

B.S., 1976, Soil & Water Science, University of California, Davis

Representative Projects

Water Resources and Rights

Gila River and Little Colorado River Adjudications, Salt River Project, Arizona—Technical advisor, overall coordination of staff and consultant efforts, water rights and economic analysis, member of negotiation team.

Snake River Basin, Idaho Water Users—Evaluation of USBR water right transfer applications; technical input to negotiations; soil, arable land, hydrologic and economic evaluation of Indian and Federal claims.

Big Horn River Adjudication, State of Wyoming—Expert witness in soils, arable lands and agronomy, land use and land ownership evaluations, technical assistance in post-trial pleadings, State water right analysis.

San Juan River Adjudication, State of New Mexico—Overall coordination and evaluation of State, Federal and Indian water rights.

Yakima River Adjudication, Yakima River Coalition, Washington—Technical coordination, water right analysis, and economic evaluations.

Appraisals of water rights for clients in Arizona, Colorado, New Mexico, and Idaho.

Threatened and Endangered Species

Snake/Columbia River Basins, Idaho Water Users—Economic and hydrologic analyses of critical habitat designations, agency decision documents, and recovery plans for threatened and endangered salmon and steelhead stocks.

Rio Grande River, New Mexico State Engineer's Office—Economic analysis of critical habitat designation for the Rio Grande silvery minnow.

Environmental Impact & Assessment Permitting

Soil, vegetation, wildlife, erosion control, economics water quality or hydrology input to environmental impact statements and environmental assessments for Denver Water Department, city of Thornton city of Aurora, city of Boulder, U.S. Forest Service, Winter Park Ski Area, Western Fuels Association and the Salt River Project in Colorado, Utah, Wyoming and Arizona.

Natural Resources

Soil surveys for the mining industry and Federal agencies (BIA, BLM and Forest Service) in California, Colorado, Wyoming, New Mexico and Montana.

Reclamation and Mine Plans in Wyoming, Utah and Colorado for UNC Mining and Milling Services, Inc., NERCO, Amoco Minerals (Cyprus Mines), Western Fuels Association, Tennessee Valley Authority and Geokinetics.

DAVID B. SHAW

Project Manager

Dave is an engineer who manages the Boise office for ERO Resources. His experience in water resources and management dates from 1974. He specializes in the identification, analysis, and resolution of water issues including coordination with other professionals in multi-disciplinary projects. Dave specializes in the following: surface and ground water supply and use studies, water rights evaluations, project management, alternative dispute resolution, expert witness testimony, and technical input on legislative and administrative matters.

Education

B.S. 1966, Agricultural Engineering, University of Idaho

M.S. 1972, Agricultural Engineering, University of Idaho

Project Experience

Water Resources

Snake River Basin Adjudication (SRBA), ID—Program manager for identification and evaluation of 170,000 claims to water rights.

Shoshone-Bannock Reserved Water Right Negotiation, ID—Co-chair of the State, Indian, Federal and private technical advisory committee.

First Water Distribution Rules Developed and Adopted in Idaho, Big Lost River Basin, ID—Team leader.

Water Right Adjudications, ID—Designated by the SRBA court as an expert in water right adjudications.

Department of Water Resources, Southwest Idaho-Western Region Manager.

Department of Water Resources, Boise, ID—Technical Support Section Manager.

Ground Water Recharge Water Right Approval, Big Lost River Basin, ID—Water Resource Negotiation/Expert.

Water Quality Analysis for Water Users, Southwest ID—Project design, implementation and management.

Evaluate Interaction of Canals on Ground Water, and Surface Water, Methow Valley, WA—Analysis of ground water/surface water supply.

Evaluate Impact of Proposed Water Right Transfer on Irrigation District Water Supply, Boise River, ID—Identify and quantify changes to ground and surface water supply if transfer were approved.

RICHARD A. HINRICHSEN

Education

A.A.S., Music, 1982, Edmonds Community College

B.S., Mathematics, 1985, Central Washington University

M.S., Mathematical Sciences, 1987, Clemson University

Ph.D., Quantitative Ecology & Resource Management, 1994, University of Washington

Societies and Associations

American Fisheries Society

American Association for the Advancement of Science

The Shad Foundation, President

Presentations and Posters

Hinrichsen, R.A. 2000. The fight against variability: Are salmon and experimental management losing? 2000 Annual General Meeting. North Pacific International Chapter of the American Fisheries Society, Mt. Vernon, Washington, April 10–12.

Hinrichsen, R.A. and C.C. Ebbesmeyer. 1997. Epic shad invasions of the Columbia River from the 1870's onward. Resource Modeling Conference, University of Washington, Seattle, Washington, June 18.

Hinrichsen, R.A. and J.J. Anderson. 1994. Understanding the migratory behavior of juvenile chinook salmon (Oncorhynchus tshawytscha). contributed poster. Pacific Salmon & Their Ecosystems: Status & Future Options. Seattle, Washington, USA.

Hinrichsen, R.A. 1993. Optimal upstream migration timing of chinook salmon (Oncorhynchus tshawytscha). Contributed paper. 1993 ESA annual meeting. Madison, Wisconsin. USA.

Hinrichsen, R.A. 1992. Optimal feeding and migration characteristics of ocean-type chinook salmon (Oncorhynchus tshawytscha). Contributed paper. 1992 ESA annual meeting. Honolulu. Hawaii, USA.

Technical Reports and Papers

Hinrichsen, R.A. 2000. Are there scientific criteria for putting short-term conservation ahead of learning No. Response to Kai N. Lee 1999: "Appraising Adaptive Management". Conservation Ecology 4(1): r7. [online] URL:http://www.consecol.org/vol4/iss1/resp7.

PATH, 2000. Preliminary Evaluation of the Learning Opportunities and Biological Consequences of Monitoring and Experimental Management Actions. Prepared by ESSA Technologies Ltd., Vancouver, BC, 150 pp.

PATH, 1999. Scoping of candidate research, monitoring and experimental management actions: concurrently reducing key uncertainties and recovering stocks. Working draft prepared by ESSA Technologies Ltd., Vancouver, BC. 232 pp.

Ingraham, W.J., C.C. Ebbesmeyer, and R.A. Hinrichsen. 1998. Imminent climate and circulation shift in Northeast Pacific Ocean could have major impact on marine resources. EOS Volume 79(6). page 197.

WILLIAM J. MCNEIL

Professor of Fisheries (Retired) and Fisheries Consultant

Oregon State University, Hatfield Marine Science Center, Newport, OR 97365; (503) 867–0100, 1066 Westfarthing NW, Salem, OR 97304; (503) 362–9134; FAX (503) 362–0365

Education

B.S. in fisheries, Oregon State University (1952); M.S. in fisheries, Oregon State University (1956); Ph.D. in fisheries, University of Washington (1962)

Employment

Self-employed consultant resent;
Professor, Coastal Oregon Marine Experiment Station (1990–1995);
Professor of Fisheries and Director, Cooperative Institute for Marine Resources Studies, Oregon State University (1985–1990);
General Manager, Oregon AquaFoods, Inc., Weyerhaeuser Co. (1976–1985);
Program Manager, Alaska Salmon Investigations, National Marine Fisheries Service (1972–1976);
Associate Professor Fisheries, Oregon State University (1966–1972);
Supervisory Fishery Research Biologist, U.S. Bureau of Commercial Fisheries (1962–1966);
Research Associate, Fisheries Research Institute, University of Washington (1956–1962)

Professional Recognition

Lectures

Norwegian Society for Aquaculture Research and Directorate for Nature Management (Norway) (1990);
Washington State University (1988); Institution Profesional de Osomo (Chile) (1987);
Lewis and Clark College (1985, 1987, and 1989);
University of Oregon (1980–1984);
Portland State University (1983);
Willamette University (1983);
TINRO (USSR) (1976. 1978, and 1990);
University of Alaska (1974–1976 and 1989).

Symposia

Keynote Speaker, Fisheries Bioengineering Symposium (1988);
Convenor, World Salmonid Conference (1986):
Keynote Speaker, Salmonid Reproduction Symposium (1983);
Convener, Panel on Ranching, World Mariculture Society (1982);
Convener, Symposium on Salmonid Ecosystems of the North Pacific (1978);
Steering Committee, North Pacific Aquaculture Symposium (1980); Steering Committee, World Technical Conference on Aquaculture (1976);
Convener, Conference on Marine Aquaculture (1968).

Advisory and Executive Committees and Societies

Scientific Advisory Committee for Prince William Sound (Alaska) Ecological Research Center (1989-present);
Secretary, Oregon Governor's Salmon Advisory Committee (1981–1986);
Advisor, Alaska Department of Commerce (1984 and 1985);
Member, Bonneville Power Admin. Research Review Panels (1985 and 1989);
Member, N.W. Power Planning Council Committee on Genetics Policies (1989);
President, Oregon Chapter American Fisheries Society (1982 and 1983);
Executive Committee, National Sea Grant Assoc. (1980–1983);
Chairman, Governor's Alaska Fisheries Council (1975–1978).
Chairman, Fisheries Technical Advisory Committee, Sheldon Jackson College (1974–1977);
Advisor, National Academy of Sciences Committee on Aquaculture (1977);
Fellow, American Institute of Fisheries Research Biologists (since 1972).

Consulting

Client	Years	Topic
Washington Water Power	1992–1994	Dams and salmon in Clearwater River, ID
Direct Service Industries	Since 1989	Endangered Species Act and salmon in the Coumbia Basin
Yakima River Basin Coalition	Since 1989	Irrigation and salmon in Yakima River, WA
Grant County PUD	1989–1992	Passage of juvenile salmon at two mid-Columbia River dams
Oregon Forest Industries Council	1991–1992	Forestry and salmon in the Pacific Northwest
Oregon Coastal Zone Management Assoc.	Since 1990	Restoration plan for Tillamook Bay, OR
Prince William Sound Aquaculture Corp	1989–1990	Impact of Exxon Valdez oil spill on hatchery salmon
Pope Resources	1988–1989	Evaluation of Hood Canal/Fort Ludlow properties for aquaculture

Publications

Approximately 80 published reports on subjects related to salmonids. The most recent publications are listed below:

McNeil, William J. 1984. Salmon ranching: a growing industry in the North Pacific. Oceanus 27 (1): 27–31.

McNeil, William J. 1985. Pink and chum salmon supply and outlook. Proceedings of the 1984 Pink and Chum Salmon Workshop, p. 186–190. Oceans and Fisheries, Canada.

McNeil, William J. and R.F. Severson. 1985. Impacts of ocean fisheries on natural and ranched stocks of Icelandic salmon. Fish Farming Symposium, Reykjavik, Iceland.

McNeil, William J. 1985. Comments on north Pacific fisheries Delphi project. In J. Yuska and N. Ridlington (editors). Seafood Quality and Product Form. Oregon Sea Grant ORESU–IN–85–004, p. 3–8.

McNeil, William J. 1987. Offshore transport and release of salmon smolts. Bonneville Power Administration Smolt Workshop, Kahneetah, Oregon.

McNeil, William J. (editor). 1988. Salmon Production, Management, and Allocation. Oregon State University Press, Corvallis, 194 pp.

McNeil, William J. 1988. Mariculture: an aid or hindrance to management. Trans. 53rd N.A. Wildl. & Nat. Res. Conf., p. 569–576.

McNeil, William J. 1989. Book review of Salmon and Trout Farming. Fisheries. 14:57–58.

Kreeger, K, and W.J. McNeil. 1989. Estuarine dependence of juvenile chinook as it relates to salmon ranching. Northwest Environ. Jour. 5: 165–167.

McNeil, William J. 1989. Aquaculture and salmon ranching. In C.L. Smith (editor). Ocean Agenda 21. Oregon Sea Grant ORESU-B–89–001, p. 52–55.

McNeil, William J. In press. Future of salmon aquaculture. American Fisheries Society Symposium 10: 12–18.

McNeil, W.J., R. Gowan. and R. Severson. 1991. Offshore release of salmon smolts. American Fisheries Society. 10; 548–553.

McNeil, William J. 1991. Expansion of cultured Pacific salmon into marine ecosystems. Aquaculture. 98: 172–183.

McNeil, William J. 1991. Sea ranching of coho salmon (*Oncorhynchus kisutch*) in Oregon. pp. 1–10. *In* N. Pedersen and E. Kjorsvik (eds). Sea Ranching—Scientific Experiences and Challenges. Proceedings from the Symposium and Workshop on Sea Ranching. Norwegian Society for Aquaculture Research 21–23 October 1990, Bergen, Norway.

McNeil, W.J. 1995. Water velocity and migration of juvenile Salmon: Is faster necessarily better? Hydro Review 14(2): April 1995.

Ebbesmeyer, C.C. and R.A. Hinrichsen. 1997. The Oceanography of the Pacific Shad Invasion. The Shad Journal. Volume 2(1): pages 4–8.

Ebbesmeyer, C.C., R.A. Hinrichsen, and W.J. Ingraham. 1996. Spring and Fall wind transitions along the West coast of North America, 1900–1994. Presented at the PICES meeting, Nanaimo, British Columbia, 18 October 1996.

Hinrichsen, R.A. 1994. Optimization models for understanding migration behavior of juvenile chinook salmon. Ph.D. dissertation. University of Washington. Seattle, WA. USA.

Hinrichsen, R.A., T. Frever, J.J. Anderson, G. Swartzman and B. Sherer. 1991. Columbia River Salmon Passage (CRiSP) Model. Documentation for CRiSP.0. Center For Quantitative Science, University of Washington, Seattle, WA.

Hinrichsen, R.A. 1987. The Leslie model with harvesting. Master's thesis. Clemson University. Clemson, S.C. USA. 29p.

COLUMBIA RIVER POWER SYSTEM: BIOLOGICAL OPINION AND THE DRAFT BASINWIDE SALMON RECOVERY STRATEGY

MONDAY, NOVEMBER 20, 2000

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON FISHERIES, WILDLIFE, AND WATER,
Boise, ID.

The subcommittee met, pursuant to recess, at 10 a.m., in the Boise City Council Chambers, 150 N. Capitol Boulevard, Boise, Idaho, Hon. Michael Crapo (chairman of the subcommittee) presiding.

Present: Senator Crapo.

OPENING STATEMENT OF HON. MICHAEL D. CRAPO, U.S. SENATOR FROM THE STATE OF IDAHO

Senator CRAPO. Good morning. We're ready to begin. The hearing will come to order. This is the third hearing in a series of hearings that the Committee on Environment and Public Works has been holding—the Subcommittee on Fisheries, Wildlife, and Water, has been holding with regard to the draft biological opinion on the Federal Columbia River Power System and the Federal Caucus Draft Basinwide Salmon Recovery Strategy.

I would like to thank everyone for being in attendance here at this hearing. The first two hearings were held on September 13 and 14 of this year, when we held 2 days of hearings in Washington, DC, to examine various aspects of the draft biological opinion.

Today's hearing will complete our current review of these Federal documents and afford those interests who will be affected by these plans and those who were unable to attend the hearing in Washington, DC, the opportunity to have their comments on the official Senate record.

Most of you who are here today were not able to be in Washington, DC, in September, and I want to take a little bit of an extended opportunity right now to review where I think we are and what we heard.

Despite several decades of work and cost to the taxpayers and rate payers of an estimated $3 billion, the Pacific Northwest salmon and steelhead continue to decline to the point where they soon may become extinct. We must not allow that extinction to happen and must proceed quickly with a consensus present for action for recovery.

I must repeat my own position, that I see no evidence that flow augmentation will recover anadromous fish, and I will not support any flow augmentation other than that agreed to by the State of Idaho, if any. The extensive political opposition to breaching the four Lower Snake dams means that such recommendation would put the region into an economic and political gridlock in such a way that it would prohibit further efforts to make reasonable efforts to save the salmon.

The Federal Caucus, a group of Federal agencies led by the National Marine Fisheries Service and the Northwest Power Planning Council, has produced their draft plans, and most significantly, the Governors of the four States in the Pacific Northwest Idaho, Montana, Washington, and Oregon—have released a series of recommendations that outline the process the Governors feel must be followed to achieve anadromous fish recovery.

Let me note here the contrast and the openness, the transparency, and the real collaboration that characterize the process used by the four Governors and their staff in preparing their recommendations. The four Governors have done a good job in identifying both the proper focus on where the real problems lie and the real balance among various solutions that are available.

The Federal Caucus would have done well to have followed the same type of process. Instead, I had to file a Freedom of Information request to find out what the Federal Caucus was doing. I even then faced opposition in full disclosure, and many others in the region still feel that they do not have and have not had the opportunity to have real collaborative input into the Federal decisionmaking process.

The primary purpose of this subcommittee's hearing here is to examine the science used to develop the draft biological opinion and the draft recovery strategy.

Let me describe the role of science as I see it. Science, economy, and culture will all be partners in recovering these wild anadromous fish. But recovery must be based in science, and we must get the science right. We must not fear good, accurate science.

Some worry about where good, accurate science may lead us and as a result may try to manipulate scientific processes or mischaracterize scientific hypotheses and conclusions. Such activity, in my opinion, is a disservice and it can only bring further gridlock and more severe penalties to the Pacific Northwest. I urge people from all perspectives to insist on good science and be willing to recognize it when we find it.

The approach I prefer is to understand the good science and then let the people and the policymakers use that science to craft a recovery plan that gives the economic and cultural partners the trust they need to be advocates and participants in the recovery.

The imposition of bad process and bad science will result in distrust and retreat into self-interest. Such a tragic path backward will have severe penalties for the Pacific Northwest and ultimately result in the loss of these incredible fish.

There is too much at stake to allow our limited resources to be applied to false schemes or solutions. We've got to get the science right.

Specifically, there are those who advocate that the science tells us the dams must be removed or that the problem is with the hydrosystem. If that is what the science tells us, then we have to listen to that science and act in that context, not avoid it. That doesn't necessarily mean that the ultimate solution would be a decision to breach the dams as we make the policy decision to address the cultural and economic considerations that are at issue, but it means we must recognize that science if it is the true science.

On the other hand, there are those who say that ocean conditions or other circumstances like that are the true problem, which we must address in the decline of these salmon and steelhead. If that is where the science leads us, then we must recognize that science and act accordingly.

An example would be if someone went to a doctor who had a bad heart and they had a perfectly healthy leg. If the doctor operated on the leg rather than treating the heart, you would not see an improvement in the circumstances.

I don't support breaching dams, but if the science says that it is the dams where the major problem is, then that's where we've got to focus our resources and our efforts. That's the kind of decision that this region needs to face.

Everything I just said about dams, as I've said, applies exactly to all the other factors, whether it be harvest, hatcheries, ocean conditions, or otherwise. We've got to get the science right so that the policy decisions can be made based on good science.

If I understand the direction that we appear to be taking now as the result of the Federal Caucus action, we have a window of time, about 8 to 10 years, to evaluate other options and to take other options toward solutions that will recover fish before the evaluation of dam breaching is then brought back to the table for further consideration. That means we have a short window of time in which we must do things right. Otherwise, if we continue to spin our wheels or make wrong decisions about how to approach recovery, we will in 5, 6, or 8 years once again be facing the difficult question of whether this region must face the breach of the four Lower Snake dams to save the fish.

Currently, there is widespread disagreement around the region as to whether the draft BiOp is reflective of the best available science. I view this disagreement as having at least two parts—the process of developing this science and the product resulting from this process. Let me first talk about process.

Our first witness at September's hearing was Idaho's Governor Dirk Kempthorne. Governor Kempthorne said, "Our commitment to this goal-restoration of all stocks of Idaho salmon is unquestionable. The question before this panel is to what extent the Federal agencies will help the States in this effort.

I have long believed that only through a regional collaborative effort will there ever be a real chance for recovery of anadromous fish in the Pacific Northwest. Only through regional cooperation, not dictates by the Federal Government, is there a chance to achieve real success. So if I had to boil down our advice to the Federal Government of the United States of America, I would do it in four words: listen to the States. These are the States united in the recovery of salmon. We share the same commitment to recovering

these remarkable species. We've taken the time and made the hard choices to reach consensus in the region, and we've created this comprehensive road map to recovery."

A few minutes later, I asked Governor Kempthorne, "Do you believe that the State of Idaho is at this table, the table of deciding and working to develop a plan for the recovery of the salmon?"

Governor Kempthorne's response,

> No, I do not. I believe that the State of Idaho is at the table with the other three States, and the State of Idaho has joined in a document that we have now submitted to the Federal Government. This is a collaborative process, and, again, I have sought through different forums, meetings with different members of agencies, of different members of the cabinet expressing my views, my concerns, but I do not feel that we were invited to the Federal table in a collaborative process as they developed this BiOp.

Later on the same day, then NMFS regional administrator, Will Stelle, said,

> The opportunity is there for the Northwest to come to terms on an agreement, a program that we can put into place and implement over the next 5 to 10 years. It is there for us if we choose to take it, and I believe in good faith that the Federal agencies, States and tribes, if we work hard, we can capture that agreement by the end of the year and get on with the business with salmon recovery.

Let me note for the record that my office has repeatedly persuaded, cajoled, and even offered to host meetings as part of my effort to, as Mr. Stelle said, capture that agreement by the end of the year.

The National Marine Fisheries Service has not accepted my offer. In fact, let me quote from the publication Columbia Basin Bulletin, November 3, 2000, issue.

> 'Our intent is to have it completed and signed by mid-December,' Brian Brown of NMFS told the Implementation Team this week. 'With the December 15 deadline, what is not clear to me is what degree of additional discussion we'll be able to have with the State and tribal managers.' He said NMFS would like to meet with the States and tribes, but he promised that few changes would be made to the revised BiOp as a result of these meetings.

To me these words have great significance because they not only acknowledge the critical lack of collaboration on behalf of the Federal Caucus with other key scientists in the Pacific Northwest including State, tribal, industry, and environmental personnel, but these words also suggest serious flaws in the science that drives this draft biological opinion.

Testimony we received at the September hearing was very critical of the science basis for this Federal plan, and even former administrator Stelle acknowledged these difficulties. Let me quote Mr. Stelle:

> How do we maintain the integrity of the process and at the same time open the doors to it so that others have the opportunity to critique it and participate in it and to help us improve it? It is not a consensus-based exercise. If something is not right from a scientific perspective its because everybody agrees. Something is right, do it. Something is right from a scientific perspective because it measures up through the scientific process. The challenge for us, Senator, is to pull those two things together. Have we done that well enough? No. Are there opportunities to continue to improve that? Yes. I would also encourage for your focus not only on this issue. This issue is not only an issue between now and December.

As an aside, let me note that this is exactly with what I'm doing and what we are doing here today.

Let me continue quoting Mr. Stelle, who was referring to the cumulative risk initiative, CRI.

So it is not a static, done product. It is not a static thing. It is not a completed product so far as finished, and it will continue to evolve and improve as scientists inside and outside have the opportunity to critique it, suggest ways to improve it. So again, if the State of Idaho's scientific people have observations or suggestions about where its flaws may be and how to correct those flaws, I believe that the NMFS scientists are open to it. It doesn't necessarily mean the NMFS scientists will agree, but, absolutely, there should be that critical review.

Then I responded, "Are you committed to reconvening the scientists in the sense to be sure that they have the chance now to be collaborative on these matters?"

Mr. Stelle responded, "Yes."

At this point, let me repeat that my office and others have consistently asked for such discussion to take place and have offered to host or facilitate any discussion. Yet, it never happened. The demonstrated behavior of the Federal Caucus is clearly that it is unwilling to engage the other important scientists in the region in a serious discussion whose objective is to resolve as many differences as possible and improve the quality of the science.

Let me again quote Brian Brown of NMFS in the Columbia Basin Bulletin of November 3rd.

For key issues—those with a large number of comments—NMFS will attempt to provide a stand-alone document describing the issues and the response. Some of those issues are NMFS' population analysis, its jeopardy standard, things like the use of CRI or a greater reliance on PATH and the level of risk NMFS is willing to accept. Brown expects that the hydro measures and their effects will continue to evolve in the BiOp based on the comments.

Basically, then, we have scientists and policymakers in the Federal Caucus saying never mind and don't worry about the fact that we haven't worked with the States and tribes in the Pacific Northwest as we develop the BiOp and trust in the Pacific Northwest when we say that we promise to work with you later after the policy has been established. My question is why should we believe that promise now?

In the September hearing, there was much discussion about whether PATH or CRI is better and what the strengths and weaknesses of the two models are, what elements are common in both approaches and what are the key differences. Our discussion at this hearing will not, of course, be able to uncover those answers, but I do believe those answers are out there and we'll find them if we look hard enough.

One of the questions I'll ask our Federal witnesses today is what are their plans and commitments to work with the State and tribal scientists and other interest groups, industry and environmental, in an attempt to get the science right and are they willing to do it before this draft biological opinion becomes final? Why should we expect this process will be any different after the biological opinion becomes final?

Let me summarize what's at stake in Idaho and the Pacific Northwest. Our salmon and steelhead are priceless treasures that are probably the best example of how nature works her magic and selects the best and the brightest for future generations. We must not allow these fish to go extinct. In fact, we must recover them to sustainable and fishable populations, if we can.

The economy of the Pacific Northwest is mainly vibrant and strong with some important exceptions, particularly in some more

rural areas that depend on agriculture and natural resource industries. We must keep our economy strong and spread its strength throughout the region. This economy provides jobs for families and tax revenues to support important work, particularly the education of our children.

As I see it, this draft biological opinion could be an incremental creeping policy initiative that will not solve the problem for fish but instead will steadily erode State and tribal sovereignty and diminish the opportunity for industry and environmental groups to have an input into the process. This document must be improved before it becomes final.

I urge the Federal Caucus to use the next few months wisely to work more collaboratively with the region and to get it right. We must accomplish both objectives and cannot allow ourselves to be misled by the premise that it has to be one or the other. We must not allow the process that developed this biological opinion nor the science produced by this process to force the region into mistakes, mistakes that could gut the region's economy and yet not recover the fish.

It's my hope and expectation that today's hearing will help us improve what has already been a decade-long, torturous, and expensive process and make it into a success that will turn the Pacific Northwest into a role model for how to recover endangered species.

As I said, this is the third in a set of hearings to address the questions of the biological opinion. There are those who felt that their position was not adequately represented in the first two hearings, and I think that was a valid perspective. That's one of the reasons that we are holding this hearing here. There are those now here today who felt that their perspective was not adequately represented in this hearing. I would remind them that their perspectives were represented very effectively, I think, in the previous hearings. There are those who will continue to believe that their perspective has not been represented adequately in any of the hearings, and we do face that problem, but we are pursuing an effort to try to get as broad a perspective on these issues as possible.

We are going to have three panels today. The first panel will be Federal witnesses from Federal agencies. I'd like to explain just briefly the process that we would like to follow with regard to the panels. We have up here a set of lights. Each of the panel members has already been advised that we would like to ask them to keep their initial statement to 5 minutes. That will give us much more time for questions and answers and give and take that will help us delve into the issues. The written testimony of all of the witnesses has been received, has been read and will be reviewed by the other members of the panel as well and is made a part of the record.

Therefore, as the witnesses are testifying, please try to keep an eye on the lights. The green light says that you still have time. The yellow light will come on when there is 1 minute remaining, and when the red light comes on, that means that the time has finished, and we ask you at that time to wrap up your comments.

I can tell you that, from past experience, if you're like I am, your time will run out long before you finish saying everything you have

to say. I assure you that there will be opportunities in question and answers for you to elaborate further on what you would like to say and that you can supplement the record. But I do encourage you to pay attention to the time so that everyone can have a fair opportunity at the hearing. If anybody does forget the lights, I will lightly rap the gavel to remind you to pay attention to the lights and to wrap up your statement.

With that, let me invite the first panel to come forward. The first panel is Mr. Michael Schiewe, the director of Salmon Research at the Northwest Fisheries Science Center for the National Marine Fisheries Service; Mr. Doug Arndt of the Fish Management Division of the Army Corps of Engineers out of Portland; Mr. Howard Schaller, Project Leader of the Columbia River Fisheries Program for the U.S. Fish and Wildlife Service out of Vancouver. I understand Mr. Rigby is here on behalf of the Bureau of Reclamation. Mr. Ken Pedde was scheduled to testify but has had an emergency come up and was not able to be here.

Gentlemen, we appreciate your presence here, and I would like to ask you to go ahead and testify. We'll have you go in the order in which I just announced your names, and then following that, we will get involved in the questions and answers.

So, Mr. Schiewe, would you please proceed?

STATEMENT OF MICHAEL SCHIEWE, DIRECTOR, NORTHWEST FISHERIES SCIENCE CENTER, FISH ECOLOGY DIVISION, NATIONAL MARINE FISHERIES SERVICE, SEATTLE, WA

Mr. SCHIEWE. Thank you, Mr. Chairman and members of the subcommittee. I'm Michael Schiewe, director of Salmon Research at the National Marine Fisheries Service's Northwest Fisheries Science Center in Seattle, WA.

Within the National Marine Fisheries Service, the science centers are responsible for providing the technical and scientific support to the regional offices in carrying out their regulatory and management responsibilities. I appreciate the opportunity to be here today. I will limit my formal comments to those involving the biological opinion and the collaboration in the scientific process.

First, to summarize from the testimony of Mr. Stelle to this subcommittee on September 13, 2000, the National Marine Fisheries Service is currently engaged in the preparation of two major documents. One is a biological opinion for the Federal Columbia River Power System. The other is a conceptual recovery plan called the All-H Paper. This latter exercise is led by NMFS, but is more broadly the product of the Federal Caucus composed of NMFS, the Army Corps of Engineers, the Bonneville Power Administration, the Bureau of Reclamation, the Fish and Wildlife Service, the Environmental Protection Agency, the Bureau of Indian Affairs, the Forest Service, and the Bureau of Land Management.

In preparing these documents, NMFS considered the results of a variety of analytical exercises and scientific syntheses including results from the Plan for Analyzing and Testing Hypotheses, or PATH; NMFS' Cumulative Risk Initiative, or CRI; and the empirical information summarized in NMFS White Papers. Following review and comment by the State agencies and tribes, both the bio-

logical opinion and the All-H Paper are currently scheduled for release in final form on December 15.

On the issue of science collaboration, a major opportunity will occur via participation in technical recovery teams. We have already formed technical recovery teams, or TRTs, to start the process for recovery planning in Puget Sound and on the Lower Columbia River and Willamette Valley, and we are considering establishing TRTs to develop recovery plans for the listed salmon and steelhead in the interior Columbia River Basin.

The process NMFS has initiated to develop these plans is a two-phase one, with the involvement of both regional technical and policy expertise in each of the relevant phases. To briefly summarize, the first phase is a scientific exercise culminating in the establishment of delisting criteria or recovery goals.

The second phase is more of a policy forum in which the options for recovery will be carefully weighed and a suite of actions selected. Both the technical phase and policy phase will involve qualified individuals from regional entities and interest groups. A recovery science review panel composed of internationally renowned ecologists and evolutionary biologists will review the products of the TRTs. Our goal is to bring together a broadly representative group of the best minds to tackle these issues.

To summarize, it is NMFS's intent that the recovery planning process will take place out in the open, that it will meaningfully involve regional scientific expertise, that the recovery plans will be subject to peer review, and that the final technical products, when appropriate, will be published in scientific journals.

Thank you for this opportunity to address the subcommittee. I would be pleased to answer any of your questions.

Senator CRAPO. Thank you very much, Mr. Schiewe.

I should have said at the beginning of this panel each of these panelists are scientists. We had their policymaker counterparts from their agencies at the hearing in Washington, DC and each of these gentlemen were there as backup, but we didn't, because of timing problems, have a chance to get to you on the scientific questions. So I realize that a statement has already been entered into the record of the hearings here by your agencies, and you may or may not want to make an additional statement. You're very welcome to make additional statements, but you may have been surprised when I set it up for you to make statements. So if any of you choose to simply answer questions, I understand that.

Mr. Arndt.

STATEMENT OF DOUG ARNDT, CHIEF, FISH MANAGEMENT DIVISION, ARMY CORPS OF ENGINEERS, NORTHWESTERN DIVISION, NORTH PACIFIC REGION, PORTLAND, OR

Mr. ARNDT. Mr. Chairman, I am Doug Arndt, Chief of the Fish Management Office in the Northwestern Division, U.S. Army Corps of Engineers. I appreciate the opportunity to be here today to discuss the status of the National Marine Fisheries Service and Fish and Wildlife Service's biological opinions on operation of the Federal Columbia River Power System.

As you noted, on September 13, you heard the testimony of Colonel Eric Mogren on behalf of the Corps. Today I'm going to very

briefly summarize that testimony, plus I'll add several topical points. Currently, 12 populations of Columbia River Basin salmon and steelhead, white sturgeon, and bull trout are listed under the Endangered Species Act. That means that we must broaden our consideration of recovery solutions from the lower Snake River to the entire life cycle of the salmon throughout the basin if we are to be successful.

On the flip side, this year we saw strong returns of adult salmon to the Columbia. We believe these results are at least partially due to the investment that the Nation has made in the hydropower system.

Consultations on the 2000 biological opinions are ongoing. We anticipate receiving a final BiOp or BiOps on or about the 15th of December. While there are still some measures that need further work, we are optimistic at this point that we would reach agreement on the major issues and on the overall direction. We are satisfied that the draft biological opinion is reflecting an increasing intent to pursue aggressive actions across all the Hs with specified performance standards and periodic check-ins.

Earlier in your opening statement you emphasized the need for good science. We are also pleased at the current regional effort to base recovery actions on the best available science. The Corps' part in this effort is to fund some 50 to 70 field research studies under our anadromous fish evaluation program. That, by the way, is a collaborative process involving the State, Federal, and tribal entities. We see this investment of some $10 to $20 million in field research in seeking out better scientific knowledge as being vitally necessary for making the reasoned management decisions that you alluded to.

On the issue of funding, full implementation of the measures called for in the biological opinions will be ambitious. It will require substantial increases in our appropriations. For example, the President's fiscal year 2001 budget submitted to Congress this year called for $91 million in the Corps' fish mitigation project. Our fiscal year appropriation, as passed by Congress, was $81 million. We estimate that some additional $5 million to $10 million may be needed to fully implement the measures in the biological opinions. Further, we anticipate the cost will increase in the out years. This is an important issue as our biological opinion report card will heavily depend on our ability to implement, read that as "fund," recovery measures.

One of the areas of the biological opinion is to call upon the Corps of Engineers to carry out actions in the offsite or habitat measures for fish restoration as a means of supplementing hydro actions. For example, we are being asked to step up our efforts in the restoration in the Columbia River estuary. We believe this is important and should be a part of our approach to the fish recovery.

We look to the Congress for continued support of these efforts. We will continue to work with you and to keep the lines of communication open.

Mr. Chairman, this concludes my summary, and I will be happy to answer any of your questions.

Senator CRAPO. Thank you very much.

Mr. Schaller.

STATEMENT OF HOWARD SCHALLER, PROJECT LEADER, COLUMBIA RIVER FISHERIES PROGRAM, U.S. FISH AND WILDLIFE SERVICE, VANCOUVER, WA

Mr. SCHALLER. Good morning, Mr. Chairman. I'm Howard Schaller from the Columbia River Program Fisheries Office of the U.S. Fish and Wildlife Service and I appreciate this opportunity to present testimony on behalf of the service regarding status of the biological opinions for the Federal Hydropower System of the Columbia.

Our office is primarily responsible for a recovery evaluation of Columbia River aquatic resources, which include sturgeon, bull trout, and salmon. The service is conducting a consultation on the operation of federally-owned hydropower facilities on the Columbia, Snake, Clearwater, Kootenai rivers in the Columbia River Basin. We're consulting with the action agencies of the Army Corps of Engineers, Bonneville Power Administration and Bureau of Reclamation. At issue are the effects of operating the Federal Hydropower System on the Endangered Kootenai River sturgeon, threatened bull trout, and to some limited degree, bald eagles.

The service received two biological assessments from the agencies, a draft document in the summer of 1999, and a final in December 1999. We shared a preliminary draft of the opinion with these agencies in May 2000, and the comments on the preliminary draft opinion were received June 2000. The draft opinion was released to the States and tribes for comment on July 27, 2000.

Throughout this process the emphasis has been placed on the discussion of key issues including minimization of adverse effects to sturgeon and bull trout from the PS operations in the Upper Columbia River. Our draft opinion requests adjustments to the operations and ramping rates at Hungry Horse, Libby, and Albany Falls dams. We're also asking the Army Corps of Engineers to continue studies of alternative pool elevations Albany Falls to benefit kokanee salmon, a key food source for bull trout in Lake Pend Oreille.

The draft opinion also addresses actions at Libby Dam to allow increase flows to chief flow objectives for sturgeon. For the Lower Columbia River, Snake River, and Clearwater River, the service will require monitoring to better determine the presence of bull trout and ensure their upstream and downstream passage is not impeded. The services work closely with National Marine Fisheries Service throughout this process to ensure that the Federal Hydro System operations benefit sturgeon, bull trout, and do not conflict with salmon and steelhead.

We are presently revising the biological opinion based on comments we received from the States, tribes, and other affected entities. We are now completing the opinion and accompanying documents and anticipate to have a final draft out by mid-December.

Mr. Chairman, this concludes my testimony, and I'll be happy to answer any of your questions that you and the members have. Thanks. This is a summary of Mr. Cottingham's comments from September.

Senator CRAPO. Thank you very much.

Mr. Rigby.

STATEMENT OF RICHARD RIGBY, PROGRAM MANAGER, WATER RIGHTS IN ACQUISITION, PACIFIC NORTHWEST REGION, BUREAU OF RECLAMATION

Mr. RIGBY. Thank you, Mr. Chairman. My name is Richard Rigby. I am program manager for Water Rights and Acquisition in the Pacific Northwest Region of the Bureau of Reclamation. My primary activity with respect to this biological opinion and previous opinions has been the provision of flow-augmentation water from the Bureau of Reclamation projects in Idaho and Oregon. As a stand-in for Mr. Pedde, I have no prepared remarks, and I'll stand for questions.

Senator CRAPO. We appreciate your being available on such short notice.

Mr. Schiewe, I want to start out with an issue with you first and then broaden to the rest of the panel. There is a specific issue that has come up in just the last couple of days relating to an article in The Oregonian, the headline being "Unreleased Federal Plan Calls for Dam Breaching" and another headline in The Statesman with a version of the same article that says, "Unreleased Plan Shows Federal Uncertainty Over Dam Breaching." Have you read the article that I'm referring to?

Mr. SCHIEWE. I did, Senator, see the article in The Oregonian but not The Idaho Statesman.

Senator CRAPO. I believe the Statesman version was just a shortened version of The Oregonian story. The question that is raised by the article is that apparently a document obtained by The Oregonian shows that just a couple of months before George Frampton from CEQ's announcement that the National Marine Fisheries Service—well, let me back up a second.

A couple of months before the BiOp came out, the National Marine Fisheries Service had fashioned an opposite plan that called for dam breaching and that something happened in that several month period of time to change the BiOp that was submitted. There is speculation that that was because of the Presidential election and the critical nature of particularly Oregon and Washington in that calculation. There is speculation that there was other disagreement over the science.

The question I have for you is, first of all, is there a document that The Oregonian claims it has that was a decision by the National Marine Fisheries Service to call for dam breaching?

Mr. SCHIEWE. Senator, I have to preface my comments by clarifying that I represent the science side of the house, not the policy or management side of the house.

Senator CRAPO. I understand that and respect the position you're in.

Mr. SCHIEWE. Accordingly, I know that we have provided scientific and technical information for a whole range of different options, sort of a menu of potential actions and what we would predict would be their outcomes. My sense is that on the policy side of the house, they probably evaluated a full range of different ones at different times, and if a policy or political decision was made at one particular instance to narrow the field, I'm not aware of that.

Senator CRAPO. So you're not aware of this document that is referred to in the article?

Mr. SCHIEWE. No, I'm not.

Senator CRAPO. That may be an answer to my followup questions, but let me ask them anyway. The obvious question that comes out there is what caused—I'm assuming the document exists since The Oregonian claims it has a copy of it. The question is, what caused the change in position by NMFS over that 2-month period of time from the initial document that is referred to here to the ultimate decision that was announced? Are you aware of any directives that came from George Frampton, the Council on Environmental Quality, or the White House, or otherwise that directed NMFS to change its position on the BiOp.

Mr. SCHIEWE. I am unaware of any of those documents. I think you would need to address that question to those parties that you mentioned.

Senator CRAPO. Are you in a position where you could take a request from me back to those appropriate parties?

Mr. SCHIEWE. I can do that.

Senator CRAPO. I would like to make this request, and we'll get this to you in more specifics, but I would like to request, first of all, a copy of the document that The Oregonian claims to have in its possession and a copy of any other memos or e-mails or communications from the Council on Environmental Quality or the White House with regard to this document.

Mr. SCHIEWE. Yes, sir.

Senator CRAPO. Thank you. Obviously, it becomes relevant as we try to determine what is in the BiOp and why what is in the BiOp is in the BiOp and whether we're looking at science or whether we are looking at politics. I think that's a critical aspect of the whole issue.

Now, let me get into a little bit broader context here. I'm aware of—in fact, I have with me here a copy of the scientific article that was published recently by the three NMFS scientists, and I'm forgetting their names right now.

Mr. SCHIEWE. I'm aware of the article.

Senator CRAPO. I also have a copy of the response to the article by several people and then the response to the response by the scientists who put out the article. Let me summarize what I understand the issue to be there, which I think is a critical issue. The scientific article put out by the National Marine Fisheries Service scientists, Kareiva, McClure, and Marvier—have I got the names right?

Mr. SCHIEWE. Yes, sir.

Senator CRAPO. The article itself, as I understand it, says that even if the dams are breached, that the salmon—that there will not be enough of a recovery for the salmon to end the decline, that the decline of the salmon will continue even with breaching of the dams. I believe that the article also concludes that if we focus on habitat and full augmentation—estuary and flow augmentation type solutions, that extinction or decline of the salmon can be avoided. Is that a fair summary of the article?

Mr. SCHIEWE. With a few caveats, yes.

Senator CRAPO. Please give me the caveats.

Mr. SCHIEWE. First, the paper concludes that if there are no deferred or referred effects of hydropower passage, that is, for some reason the fish are weakened and incur large mortality later in the life cycle, then the benefits achieved by improving survival to a near perfect one going up and downstream in a hydropower corridor would not be enough numerically to put the populations on a positive trajectory where they're actually replacing themselves and increasing.

The two areas identified that were ripe for improvement because the greatest mortality occurs during those phases would be the first year of life before they reached the hydropower corridor in the habitats, and, second, in the estuary and near-shore ocean transition. The habitat area is one in which anywhere from 95-plus percent of the juvenile fish die, hence, somewhat modest changes could bring greatly improved survival in that phase. These are numerical experiments.

The feasibility analysis is something that needs to be yet done. The estuary flows could be one part of improving survival in that particular phase because the estuary and the plume created by flows are a complex ecological system that has a major influence on salmon survival; however, there are several other aspects of estuary restoration and rehabilitation other than just flows, removal of dikes, changes in the distribution of exotic predators, and other such activities.

Senator CRAPO. Now, the response to these scientists' reports states that the problem with the conclusion of the report is that the first year survival rates, i.e., before migration downriver, have not declined since the construction of Snake River Dam. Therefore, nothing is changed. In fact, in some areas, it's actually improved in terms of that first year part of the life cycle. Do you have a response to that?

Mr. SCHIEWE. Yes, Senator. I think this would be an instance where we wouldn't be in total agreement that there aren't opportunities to improve habitat, even in some of the, "pristine habitats" of Idaho. We have gone back and looked at the record and found that some of those areas cited as being near perfect, have large numbers of mining claims. There's some hazardous mining sites. They're highly allocated for grazing. There are lots of unscreened diversions in other areas, and so I think there are, in fact, some opportunities to improve survival in that phase.

Senator CRAPO. What about the Middle Fork of the Salmon? My understanding of the Middle Fork is that it's got pristine habitat right now and that there is little, if any, historic grazing, mining, logging, or any other water diversions in that area, and if the adult fish returning to this region have not been subjected to harvest in Idaho since 1978, so you have a pristine area that doesn't have any of these qualities. Yet the decline is evident there as well. Is that not an indication that the problem is not necessarily with the habitat?

Mr. SCHIEWE. Senator, on reviewing some of the land-use activities in those areas, we've done some research and, in fact, Marsh Creek has two water diversion, has 41 percent of its catchment allocated for sheep grazing, has a mine claim density of approximately seven claims per square kilometer and has five mining re-

lated hazardous potential sites. These data are summarized through the ICBEMP documents. So it might be as good or as close to pristine as we have, but these statistics would suggest otherwise.

Senator CRAPO. So in other words, you don't agree that the habitat in the Middle Fork of the Salmon is pristine?

Mr. SCHIEWE. I would say that if you define pristine as absolutely unimpacted, I would say, "Yes, I disagree". Is it perhaps some of the best we have? Yes, it is. But is it a situation in which we do not have opportunity to improve it? I would say we do have that opportunity.

Senator CRAPO. Here's what I'm getting at and I'm going to ask if any of the other members of the panel would like to comment on this line of questioning, so feel free to be ready, if you would like to do so.

I read the All-H paper that was put out by the Federal Caucus as it was preparing the biological opinion, and, frankly, as I read it, it appeared to be a very command and control type approach, particularly a recommended—what it did was it laid out all the different options, but it seemed to me that the options that it tended to focus on were—particularly now that we see the biological opinion as moving in that direction—were options that focused on a command and control type approach to asserting more and more Federal control over water and water management in the Pacific Northwest, more and more Federal control over habitat and control of habitat in the Pacific Northwest. Frankly, it was somewhat alarming to see that kind of proposal for increased Federal control of the land and the water that has traditionally been managed by the States.

If the BiOp takes us in a direction of saying we want to go out there and for the next 5, 6, or 7 years assert more Federal control over water and more Federal control over habitat to see if that's going to save the salmon, and if we already have areas that at least some are saying are pristine and that that's not where the problem is, and we spend 5, 6, or 8 years having increased Federal control asserted over these areas of prior State control and jurisdiction without a positive effect on the salmon, that we have, in effect, not spent that 5 to 6 years doing what could have been done best to help restore the salmon and spent that 5 or 6 years locking in more Federal control over the management of the land in the West.

So that's why this is a very critical issue. Yet, if I understand your testimony, you're standing by the fact that the best gains for the salmon, if we're going to use the next 5 to 6 years for the best we can do for the salmon, that those best results can be obtained in the first year of the life, which is in the habitat and the premigration portion of salmon's life cycle. Is that what you're saying?

Mr. SCHIEWE. From a numerical standpoint, it is fact that the greatest mortality occurs in the first year and in the estuary and ocean transition. Senator, that means that these life stages represent the opportunity to improve survival most and put them onto a track toward recovery. I don't think the intent of the All-H paper or the BiOp with its offsite mitigation, however, is to narrow the options to just those particular issues. I think that the National

Marine Fisheries Service and Federal Caucus in general are looking to balance and take advantage of opportunities to improve survival in any of the life-history stages—no matter what the cause, whether they're habitat, whether they're hydro, whether they're harvest, or whether they're hatchery operations.

Senator CRAPO. It's kind of an interesting change—what appears to be a change in position on NMFS's part because if The Oregonian story is correct, there was a document that said that the engineering and plans for breaching the dams were to be prepared by the year 2003, and now you're testifying that, really, the other parts of the salmon's life cycle are the areas where we must focus our attention. Is it fair to say that there has been that kind of a dramatic reversal by NMFS in its position over the last 6 to 8 months?

Mr. SCHIEWE. Again, I don't speak, for the policy side of the house. Biologically, I think most biologists in the region who have worked on this for a number of years, as I have, recognize the importance of improving the plight of salmon through changes and reductions of risks in each and every life-history stage, wherever possible, and recognizing that this has to be done in an economic and cultural context as you have alluded to.

Senator CRAPO. Thank you.

Would any other members of the panel like to comment on this issue?

Mr. Schaller.

Mr. SCHALLER. I think the way Dr. Schiewe characterized his interpretation of the paper is correct in that the biggest mortalities occur in the first year of life and in the estuary. The real question in what the approach in this biological opinion is going to be is whether it's feasible to actually make those improvements in the first year of life. That is, do they naturally occur? Is that level of mortality natural or is there room for improvement? So through monitoring and evaluation, the purpose is to determine whether that type of improvement is feasible.

Second, I think to reemphasize this paper, in terms of the dam-breaching issue, also came to a very similar conclusion that the previous scientific analysis did, and that is that the direct mortality from the dams by removing all that won't be sufficient to recover these stocks. The real issue—and, again, through the monitoring and evaluation program is to determine whether the delayed mortality or the stress of the hydrosystem is large enough that the dam-breaching option in conjunction with all these other areas would be sufficient.

Senator CRAPO. Mr. Arndt.

Mr. ARNDT. Thank you, sir. I guess I would like to kind of say "me, too" in terms of what Dr. Schiewe has said. That is that we have felt that in the past there had been—if anything, the actions had been somewhat hydrocentric and that the scope, the life cycle scope that's being looked at now is appropriate and timely. I don't think that is coming at the lack of hydro actions. As I indicated earlier in my testimony, we are still moving ahead with a very aggressive, intensive program to improve—further improve where we can, the survival of the fish of the hydrosystem.

But I think rather the idea is to bring Federal funds and Federal energy to the regional table in these other efforts, particularly in habitat. I don't see that as being a command and control activity, but rather one of trying to help leverage the regional, the State, local actions that can take place and give us the opportunity for improved survival.

Senator CRAPO. Thank you.

Did you have anything to add, Mr. Rigby, on this?

Mr. RIGBY. I do not.

Senator CRAPO. It seems to me that the issue we're talking about here is critical because I have in front of me a statement by some scientists which says that there is little scope for increasing survival during this stage, which is the stage that you've just said is where the best opportunity for improvement is, and that we should be focusing on the river and the hydrosystem, where the best opportunity for an impact on the life cycle of the salmon is.

I have the scientific study in front of me from National Marine Fisheries Service, which you are all, I believe, supporting it to some extent, which says that the best stage is to focus on the—as you say, Mr. Schiewe, the first year, which is in the original habitat, and then in the estuaries after they've made it to the ocean eventually—two very, very different conclusions about what the best thing to do in the next 5 years is, two very, very different conclusions about what the science tells us is the best we can do to help these fish. To me it seems critical.

One says—and I've talked to scientists for the last 8 years. Since I've served in Congress, I think I've talked to—I've read every scientific report that has been published by any of your agencies and others and every bit of information that's been submitted to me by the interest groups from one perspective or the other. I've spent time personally with the head of the ISAB, the science team, and with others, and it seems to me that what we have been hearing, which I think Mr. Schaller indicated, was for quite some time an indication that of all the Hs that we're talking about—and we have to expand that, I think, with ocean conditions that we are now getting a better understanding of—that the biggest impact was the hydrosystem. That's what I've been hearing for 8 years.

Today I'm hearing that it's not; is that right, that the hydrosystem—let's just take the four Hs, habitat, hydro, and so forth. Is it not true that the hydrosystem is the biggest impact of those H's?

Mr. SCHIEWE. Mr. Chairman, in order to answer that, I think the first issue that would have to be resolved would be to attempt to partition natural mortality versus anthropogenic or that caused by human causes. The greatest mortality occurs very early in the salmon life cycle and most of that is probably natural—although, habitat can contribute too. Among the anthropogenic causes, the hydropower system was a major source of mortaility and, it wreaked havoc with the salmon populations when it was first used. But the more recent estimates of downstream mortality that have been obtainable with the use of PIT tags and with the use of the transportation program, indicate that the impacts of the hydropower system are far less than they used to be. In fact, if we ignore transportation altogether and look only at measured in-river sur-

vival, we find that survival now is similar to what we had back in the 1960's with four dams in place—even though there are eight dams in place. I would attribute this to the many changes we've been able to make in the operation and structural forms of those dams—putting in bypass systems to keep more fish out of turbines, spilling more water; short of what causes gas bubble disease but that which improves in-river survival; and minimizing power peaking and other operational practices that are currently the norm.

All of these have had a profound effect on improving survival within the hydropower corridor. As articulated in the biological opinion, we still think we can squeeze some more out of it, but we probably are starting to come to the point where there's not much more to be gained with it in place.

Senator CRAPO. Mr. Schaller, do you want to add anything to that?

Mr. SCHALLER. The only thing that I'd add is really the big question before us, the region, is what is the delayed component of that mortality, the hydrosystem. That needs to be addressed and taken into consideration when we go through this process over the next 8 to 10 years because the amount of stress and delayed mortality and considering a large component of these upper-basin fish are put in barges. The real issue is going to be what is the level of delayed hydrosystem mortality, and is there any differential delayed mortality for the transport fish.

Senator CRAPO. I think that's one issue on which there is virtually unanimous agreement. We've got to answer that question. I want to shift for just a moment because I think it's relevant to you, Mr. Arndt. In its comments on the Draft Basinwide Recovery Strategy, the State of Idaho offered several suggestions with regard to the hydrosystem modifications not including breaching the four Lower Snake dams. In other words, what can we do with the hydrosystem short of breaching. Examples include minimum gap runner or turbines, bypass systems, turbine screens, fish-collector and fish-ladder improvements, and PIT tag detectors at all dams.

The question I have is, is there any barrier to doing these modifications with regard to engineering or construction?

Mr. ARNDT. Technically, no. There is obviously, in some instances, a procedural environmental documentation we have to go through. But I think that the simple answer is, no. In fact, the kinds of research that we're looking at carrying out now or in the near term includes further improvement studies, dissolved gas-abatement work, adult PIT tag development, which is critical to understanding the survivability of the adult fish as they move through the system, surface-bypass development, fish-transportation evaluation to get at the kind of questions that Dr. Schaller raised, avian predation-control studies. Obviously, we know that has a big impact down in the estuary.

So I think the answer is no. We're moving ahead very aggressively to look at everything and anything we can to improve survivability through the hydrosystem.

Senator CRAPO. Do you have a sense of how long it would take to get these—at least these construction-related and engineering-related improvements put into place at the dams?

Mr. ARNDT. It varies somewhat depending on the type of improvement we're talking about, but, for example, on the turbine-improvement studies, as you probably know, we've already had a year of results from the Bonneville Dam minimum gap-runner work, which was extremely encouraging. We're very pleased with that, so much so that we are now moving to The Dalles Dam, where we have a turbine replacement program underway, and we're going to look at actually installing the minimum gap runners at the Dalles. So in that case, we're moving ahead right now.

Most of these other things—the surface bypass we're working on right now. A better way to spill using spillway weirs is underway. So most of these things we're actually moving into right now.

Senator CRAPO. Mr. Schiewe, is there any problem from NMFS's point of view with moving ahead as aggressively as possible on each of these dam improvements?

Mr. SCHIEWE. Absolutely no problem at all, sir.

Senator CRAPO. This next question is probably for Mr. Schaller and Mr. Schiewe. Though, again, any of you can feel free to jump in on this at any time, if you choose to do so. There's a concern that has been expressed to me that the NMFS threshold selection ignored the real possibility of an extinction vortex. You probably are aware of that debate. NMFS was asked to at least model a range of thresholds more conservative than one fish in any given year so that decisionmakers could see the impact of this low extinction threshold and what it did to both the extinction risk and the amount of survival improvements needed to avoid the threshold.

Is it true that the draft BiOp not only failed to analyze the more conservative threshold, but, in fact, lowered the bar even further by using the threshold of zero fish or a full generational cycle of about 5 years?

Mr. SCHIEWE. Let me begin to answer that, Senator, but then I think I'll defer to Dr. Schaller.

It is true that the draft BiOp considered only one threshold. It is being reconsidered now, however. It's an item that is basically in play and being reworked and I know Dr. Schaller has done an analysis; is that correct, of the effects of considering different levels of risk and different periods of time? He can probably address that better than I. Our intent is to include that analysis in the final version.

Mr. SCHALLER. NMFS, as you correctly outlined in the initial draft, they looked at a threshold level of one fish over an entire generation, and through the comment period and working collaboratively with NMFS, we've been exploring looking at threshold levels of higher values, and they do, indeed, affect the extinction probabilities, and NMFS has recognized that problem and, I believe, working and looking at how they're going to evaluate extinction probabilities, and, really, how that translates is into some of the performance measures that are going to be adopted to look at what occurs over the next 8 to 10 years.

So it is a critical piece, and I think that there has been a lot of effort through the region to evaluate these threshold levels and their effects and to look at a reasonable threshold level and how it affects extinction probabilities in a more conservative perspective.

Senator CRAPO. Is it a problem that this hasn't been done and yet there's a December 15 deadline in terms of adopting the BiOp?

Mr. SCHIEWE. I don't think it will be a problem, sir. Again, the full range is being explored, and, again, it's in play now how it will be incorporated. One of the changes that I know that is being contemplated—again, this is more a policy issue of selecting from a menu than it is a scientific decision per se, but the draft BiOp used a standard of reducing the risk of extinction to 5 percent or less in 100 years. What's being contemplated now is moving that to a more conservative 1 percent of extinction in 100 years.

Do please keep in mind, sir, that these calculated risks have uncertainty associated with them. Probably the best way to look at them is in a relative sense and prioritizing stocks and populations for recovery actions. Those at greater risk obviously need our attention before those that are at lesser risk.

Senator CRAPO. Back to the question of delayed mortality, I want to divert for just a moment. It's been brought to my attention in a number of discussions that although delayed mortality is becoming one of the critical issues that we've got to address in terms of answering some of the things we've been talking about this morning, but it's incredibly difficult to study. Is it possible to put together an experiment to study whether delayed mortality exists and to what extent it exists without breaching dams?

Mr. SCHIEWE. That's the $64,000 question. I think it certainly is possible. It would be much easier if we had two Columbia River systems and we were able to on paper remove one and not remove the other and run that grand experiment. That obviously isn't an option. We're looking now in concert with the Corps of Engineers, Columbia River Fish Management Program to develop a series of studies that would look at potential causes for delayed mortality in fish that have transited the hydropower system by moving fish to experimental facilities and holding them and subjecting them to various analyses measuring the potential for stress, for increased diseases, and the various kinds of things that would probably come into play if, in fact, there was a delayed mortality.

Senator CRAPO. Thank you.

Mr. Schaller, do you have anything to expand on that with?

Mr. SCHALLER. The only thing that I'd say is we'll have the results of stock comparisons throughout the basin. We'll have additional years of stock comparisons that will help along with these more directed studies to look at what are the inferences about the relative levels of delayed mortality and how that plays throughout these larger numeric experiments.

Senator CRAPO. It seems to me that determining the amount of survival improvements necessary to avoid jeopardy and to provide recovery is a key element in developing recovery action. Why was the CRI approach in that model used to develop the probability of recovery when it assumes that populations continue to grow exponentially? Doesn't the rate of population growth slow as spawning numbers approach recovery levels?

Mr. SCHIEWE. Another way of asking that same question, Senator, is the fact that CRI chose not to use a density-dependent model, and there has been quite a bit of regional debate about that. Again, our scientists have found no evidence of density dependence;

we're really at the low end of the population growth curve. Density dependence would come into play when we're close to recovery rather than at this point where many of these populations are struggling to persist.

What you bring up was an issue which we raised with the PATH models that were used. Those population models projected that the populations would increase no matter what actions we undertook, and that was one of the reasons why we chose to look to some different kinds of models as well. In the end, we used both to inform our process, though.

Senator CRAPO. Wouldn't a more conservative approach that incorporated density-dependence as populations grow be more risk averse? Isn't that the objective we should focus on?

Mr. SCHIEWE. Again, Senator, the only evidence we saw of any kind of density-related dependence was what they call "depensation," which means that when you get to very low densities, rather than very high densities, the populations shrink a little bit faster and this gets a little bit to your issue of the extinction vortex. I'm hopeful that we'll get to a point where we have enough fish where we have to worry more seriously about density dependence sooner rather than later.

Senator CRAPO. So in other words, if we can get to the point where this becomes more critical, there's still room to adjust the models?

Mr. SCHIEWE. There certainly is. This is an evolving process.

Senator CRAPO. Mr. Rigby, I do have a couple of questions for you. I have in front of me a copy of a letter signed by BOR regional director, Bill McDonald, saying, in part, we find Idaho's comments on Chapter 6 of the draft biological opinion effects of the action to be generally consistent with comments Reclamation provided to NMFS on October 5, 2000.

First of all, I should ask you, are you familiar with this letter from Bill McDonald to Donna Darm relating to the Idaho comments?

Mr. RIGBY. Yes, Mr. Chairman, I am.

Senator CRAPO. I'm going to read the rest of this one paragraph. He says Idaho's hydrologic analysis summarized in Figures 2 through 5 in part 1 of their comments are both factual and based on a more sophisticated analysis than that previously undertaken. Idaho's comments represent a major improvement in identifying the true effects of Bureau of Reclamation storage operations.

First of all, do you agree with the statement in the letter?

Mr. RIGBY. I do, sir.

Senator CRAPO. Mr. Rigby, briefly, what do you believe to be the true effects of BOR storage operations?

Mr. RIGBY. I might back up just a little bit, Mr. Chairman, and say that I consider the process of identifying the impacts of Reclamation projects to be work-in-progress, something we need to work at and have worked at for some time. To summarize what I think Reclamation's views and Idaho's comments were, when Reclamation came on the scene in 1902, in much of the basin the development of water resources had maxed out the available supply and stream flows were often dry many times in the late season in many places that are not dry today.

The main impact from Reclamation has been to provide storage reservoirs that have stored water in the wintertime during the spring freshet and release that water for subsequent diversion in the summertime. So it's Reclamation's view that the impacts from Reclamation projects are to reduce flows in the winter and in the spring and to increase flows in the late summer, the July and August period.

Senator CRAPO. Have you seen—I'm sure you have seen the charts that Mr. Dreher from Idaho has presented about the impact of water augmentation from these projects——

Mr. RIGBY. I have, sir.

Senator CRAPO [continuing]. On flows in the Columbia and Snake Rivers. Do you agree that those charts are accurate?

Mr. RIGBY. I believe it's a matter of arithmetic.

Senator CRAPO. Why?

Mr. RIGBY. I think he's counting CFS and acre feet. They seem to be accurate.

Senator CRAPO. The conclusion that I reach from looking at those charts is that there is virtually no meaningful impact coming from the BOR projects we're talking about with regard to the flow. Do you agree with that conclusion?

Mr. RIGBY. Well, our effort has been trying to resolve ESA problems. I would rather not characterize the magnitude of those changes and let people draw their own conclusions.

Senator CRAPO. I think we'll probably see some charts either here today or on other occasions. Without objection, this letter will be made a part of the record.

I just have one final question for the panel or line of questions. The draft BiOp essentially says that if the measures called for in the BiOp do not show enough progress, then the Federal Caucus will then return to the breach question. Today and during our September hearings, as we have heard—I think we will hear that there's a lot of dispute as to whether these measures are going to work. There's this scientific debate that we've already talked about which part of the life cycle you focus on and what do you do in those life cycles.

The question comes down to this: If, in fact, the National Marine Fisheries Service was prepared to recommend breaching the dams and to begin doing the engineering work and have it finalized by 2003, and then over a short period of months, changed that decision—we still don't know why, and I understand, Mr. Schiewe, that you're not in a position to answer that question—aren't we faced, basically, with a circumstance in which if we don't do the very best that we can do during the next 5 or 6 years, then we will see NMFS come down with a recommendation to breach the dams?

Mr. SCHIEWE. I would certainly endorse the concept of doing the very best we can do. Although, it is still in play exactly how the wording will be used in the biological opinion, NMFS intent is to have 5- and 8-year check-ins on a 10-year biological opinion with the option that if the populations are still on a steep trajectory toward extinction that we would defer to the action agencies to seek congressional authorization to remove dams.

Senator CRAPO. Any others want to comment on that question? Mr. Arndt?

Mr. ARNDT. Certainly, I think the intent now is to move ahead aggressively short of carrying out those kind of Draconian actions with the idea that at some point if those actions are not showing success, that we're going to have to go back and consult and certainly consider actions that could be more aggressive and depending on where we're falling short—and one point I would want to make there is if we're falling short, say, on mid- or upper-Columbia stocks, we may not look at breaching Lower Snake River dams. I don't think that's the only option on the table. But certainly, if the Snake River stocks are not doing well, I would think that we are going to have to look hard at what kind of actions can be taken there to further improve survival.

Senator CRAPO. Mr. Schaller, do you want to add anything?

Mr. SCHALLER. The only thing that I'd add is that—and from the Service's perspective we just want to ensure that the scientific quality of performance measures and how they're evaluated are of the highest quality and done in a collaborative fashion in the region.

Senator CRAPO. Well, the reason I ask this question is because, as I indicated earlier, if we have a decisionmaking path that is really focused on breaching the dams but is going to try some other things first, then those other things become pretty critical, particularly if, as I have said, they involve the assertion of extensive new Federal control over water and extensive new Federal control over habitat measures that are imposed on the people of the Pacific Northwest when in the minds of at least some, that's not the area where the focus ought to be.

We could end up with a circumstance in which we spend the next 5 to 8 years seeing the expansion of Federal management over water and habitat land in the Pacific Northwest and then see the dams breached. It would seem to me that a much better resolution would be—if the scientists who say that you need to focus on the hydrosystem as the correct focus, we need to do our maximum focus there as much as we can without breaching the dams to see if we can, as I think you have said earlier, get the very best reduction of mortality in the hydrosystem possible so that we know we have done our very best in that area.

I assume from what I'm hearing here that there is no objection to doing that in the hydrosystem. Is there any objection from any of the Federal panelists here at the scientific level? I see no's from all four of the panel members.

This question is one that I realize that you can answer, but I would like to ask it and encourage you to take it back to your policy counterparts in your agencies. But the question I ask is faced with all of this uncertainty and these kinds of questions and the critical importance of getting it right, why does the Federal Caucus not continue—or I shouldn't say continue—why doesn't it begin a meaningful collaborative process with the States, the tribes, the environmental community, the industry representatives, and others who have very strong opinions and I think some pretty strong science with them as well as to what the plan out to be?

Probably the best way to encapsulate that is to say the four Governors did this. They sat down. They collaborated. They have a much more consensus-based approach, and I think if nothing else

there will be confidence in the region if we follow a collaborative-based consensus model that we did our very best as we approach these decisions.

I'm not expecting you to answer this, although you're welcome to give me an answer right now if you have one. My encouragement to the Federal agencies, in particular NMFS, is that they engage in that collaborative process soon. I'm encouraging NMFS to not force a December 15 deadline and get engaged in a consensus-building process as quickly as possible so that we cannot be engaged in conflict after the December 15 decision is made.

Do any of you want to make a comment on that?

Mr. SCHIEWE. No, sir. I will take it back, though.

Senator CRAPO. I appreciate that.

One last thing, I expect that we will hear some testimony today about the impact of the ocean on all this. We haven't talked about that much. But I would appreciate any comments that any of you have with regard to the relative importance of ocean impacts as opposed to hydro impacts as opposed to habitat or water augmentation and the like.

I'm right now trying to evaluate the information that's coming to me from various perspectives about what the science is telling us where the problems are.

Mr. Schiewe, do you have any comments on that general issue?

Mr. SCHIEWE. I would say that I think that the ocean has huge effects on the dynamics of salmon populations. Further, that the strong salmon return we've seen in the Columbia this year and in other rivers throughout the Northwest—as well as what's predicted for next year based upon the returns of precocious males or jacks—emphasizes the potential importance of the ocean. At the National Marine Fisheries Service, we are actively engaged in research to better understand the factors that affect survival in the near shore ocean.

I think—as has been brought up by a number of other people—that the most important aspect of understanding ocean conditions and ocean factors is going to be to develop a context for evaluating change that we may make in fresh water. Try as we might, we aren't going to be able to effect changes in the ocean through our manipulations.

Senator CRAPO. Any other comments, Mr. Schaller?

Mr. SCHALLER. The only thing that I'd add is the last part of Dr. Schiewe's comments is that it's very difficult to make any changes in the ocean environment. I think what we need to recognize is through management in all four Hs, we have to take into consideration that there is going to be a cyclical nature to the ocean conditions, and generally they're just an indication of broad climatic factors across the whole Northwest and that our management approaches will need to take into consideration those climatic and ocean conditions when crafting approaches—risk averse approaches in putting together all four H-management strategies.

Senator CRAPO. Mr. Arndt, or Mr. Rigby, did you care to comment on this?

[No response.]

Senator CRAPO. It seems to me—just as a final wrap-up here with regard to the answers that both of you just gave, it seems to

me that once we get, if we can get, to a point where the science is pretty much agreed to, or even if we just end up moving ahead on something that the decisionmaker gets to say the science is, but the question of the relative impacts of these various factors becomes critical to the policymaker because once the science is understood or once the science is agreed to that we'll be dealing with, then you have to work in the questions of the economic impacts, the cultural impacts, and the political complications that come to bear. The policymakers then have to make very difficult decisions.

So the question that I see that we need to answer and relatively quickly between, say, the ocean, the harvest, the habitat, the hydrosystem, the predation issues, and the list goes on, the estuaries and the first-year life cycle versus the travel through the hydrosystem issues and all of those is what is the relative relationship between them?

For example, if the ocean is 99 percent of the issue and we're tinkering around with 1 percent of issue on all of these other issues that we're talking about, that's pretty relevant to a policy decisionmaker. On the other hand, if the ocean is 20 percent of the issue or 30 percent of the issue, and the dams are some percent of the issue and the habitat is some percent of the issue and so forth, that changes the entire policy decisionmaking perspective. Do we have any answers in that regard in terms of even broad estimates of the relative impact of these various issues, or do we still need further study on that?

Mr. SCHIEWE. I think you can always refine them, Senator, but we do have these estimates—these are the basis for most of the life cycle models. They are built around estimation of the mortality that occurs in each of the life-history stanzas of the salmon, and, again, the vast majority occurs very early in the first year of life and at the near shore ocean transition. It's less in other life-history stanzas, but we do have a pretty good idea of what it is, and we're looking to make changes in any and all of those, if we can.

Senator CRAPO. OK. Anything further from the panel?

All right. I thank you both for sitting through the Washington hearings when we asked you to be there and for also being here for these hearings and for providing your information. I would like to ask you, if you can, to hang around and listen to the other testimony. I know you may have other engagements, but there may be some questions that come up as a result of that that we'd like to ask you to answer outside the record.

This panel is excused, and we will call up our second panel.

Our second panel is Mr. James Anderson of the Columbia Basin Research in Seattle, WA; Mr. Charles Paulsen, president of Paulsen Environment Research in Lake Oswego, OR; Mr. Karl Dreher, director of the Idaho Department of Water Resources; and Mr. Russell Thurow, fisheries research scientist for the Rocky Mountain Research Station in Boise, ID.

You all heard the instructions. I'd ask you to please try to stick with the 5-minutes so we can get into a more thorough discussion and questions and answers. But why don't we proceed.

Mr. Anderson, you may go first.

STATEMENT OF JAMES ANDERSON, COLUMBIA BASIN RESEARCH, SEATTLE, WA

Mr. ANDERSON. Thank you, Mr. Chairman. My name is Jim Anderson. I'm an associate professor at the University of Washington. I've been involved with the Columbia River research for about two decades.

What I want to do today is present a concept of how I think what's been responsible for salmon decline in the general sense and then ask how the BiOp is addressing these issues. As you've alluded to earlier, decline of salmon is really due to the interaction of the decadal or the climate/ocean fluctuations along with cumulative impacts of society. We are now in a situation where the ocean is cooler with fish coming back in numbers not seen in several decades.

This is a temporal phenomena which will change eventually and there's really two possibilities I think the BiOp needs to be viewed within. One is that there are decadal scales, and at the end of this decade, we're going to have a lot of fish coming into the Columbia River because we've returned to those good conditions.

The other possibility is global warming is really going to be driving things. We're going to have a drier land and a warmer ocean in the future, and in that case, we're going to have conditions where maybe fish are very bad off sometime in the future. Either case, we expect to have drier conditions, and we expect more stress on the fish sometime in the future. So what I want to do is address—Is the BiOp preparing us right now for these conditions whether they happen in 5 years or in 30 years?

Can the BiOp monitoring, within this 10-year period, really tell us much about the success of the BiOp actions are? I believe that period is just too short. Our analysis in PATH, showed it takes 10 to 20 years to evaluate the impacts of some of the actions that are being proposed. Within the 5-year period, basically we're going to see the impacts on fish that are spawning right now, and in the 8-year period we'll just have a couple more brood years. So the ocean is going to be the major driving factor affecting decisions at the end of this decade.

Now, there are other ways, other things that the BiOp considers, the physical factors. Here we have standards, for instance, flow, temperature, and sediment levels, which are not being connected to the survival of the fish. I think that this is a problem. The BiOp needs to really put upper and lower estimates on impacts of, for instance, flow, temperature, and things like this.

Can the BiOp really assess the effectiveness of dam breaching? It's been pointed out and I think a lot of people understand now that it's going to be a very difficult thing to address. I don't see right now that the BiOp is really dealing with these issues well because we have to find out something happening in one life stage that causes mortality in another life stage. This is just a difficult scientific question to deal with.

Now, flow is a particularly difficult one. The BiOp has a very aggressive flow policy right now. NMFS's research has shown insignificant impacts of flow. Most of the analysis has related the seasonal natural variations in flow to survival, but then the action we're taking is augmentation within a year, which is on top of the

natural seasonal variations. Flow augmentation is very different from the seasonal variation, and NMFS has not come—no one has come to grips with this difference.

There needs to be research to address augmentation specifically and it goes beyond taking—doing correlations between seasonal or year-to-year variations in flow and survival.

Now, I've mentioned in several of my testimonies before that hatcheries are important, and I continue to question whether or not we're dealing with hatcheries properly. Many of the wild stocks have hatchery influences, and the way that hatcheries are being dealt with is different. For Fall Chinook in the Snake River, a hatchery is considered part of the ESU, but then we have these very successful Carson Creek hatchery fish, being clubbed before they can spawn in the system.

I just wonder if maybe hatcheries should be considered part of the ESU and they should be considered as refugium during these coming years, several decades from now when we are going to have greater demands for the resources and we're going to have dryer conditions.

The final comment in my testimony relates to whether or not stakeholders are represented properly. There has been a lot of discussion on this. I don't believe they have, and I think it's a very difficult problem to find a way to herd these scientists so we can actually get something coherent and comprehensible to you. With that, I'll conclude my testimony. Thank you.

Senator CRAPO. Thank you very much, Dr. Anderson.

Mr. Paulsen.

STATEMENT OF CHARLES PAULSEN, PRESIDENT, PAULSON ENVIRONMENT RESEARCH, LAKE OSWEGO, OR

Mr. PAULSEN. I am Charlie Paulsen. I'm an independent consultant, do mostly work for Federal agencies, but I will emphasize right from the get-go here that the opinions and so forth are mine and not those of folks who have underwritten my research.

I was asked to comment on science and the BiOp, and I guess I'll briefly touch on the CRI and PATH, a couple of BiOp actions, and then uncertainties that I think are important. Something to keep in mind with the CRI, especially with regard to collaboration, is, basically, NMFS says it has analyzed about 12 ESUs in the course of 12 months. I was a participant in PATH. It took us 5 years to get basically through two ESUs. For those who want to do a more collaborative effort, which I think is a good thing, you're going to need to build some time into the schedule to do that. You won't be able to get one ESU a month if that's what you're shooting for.

In addition, the models that CRI is using are new—or at least their application of salmon is new. They've been evolving very fast, and for those of us who have been kind of involved at the edge of this but not within NMFS, it's hard to keep up with what version of the model you're talking about they're using for this month as opposed to last month as opposed to a year ago's results.

Whether you're using CRI style models or any others, you have to keep in mind the survival rates. The number of fish that return each year and so forth are very highly variable. The number of fish

coming back to spawn can vary by a factor of 10 over the course of a few years. With any model, predicting the future is a very imprecise exercise. We don't know how to predict how many fish are going to come back next year or 2 years from now let alone 20 years or 100 years from now, and that's something to keep in mind when looking at all of these models. None of them are going to be able to make precise predictions.

One thing that CRI has done that I think is really good is addressing what they call hatchery effectiveness, how good are hatchery fish that spawn in the wild when it comes to producing progeny 4 or 5 years later. It's really important for many stocks, especially in the mid-Columbia, to a lesser degree in the Snake and elsewhere. Most other groups have not really tried to take this on. I think it's going to be a really important issue in the future.

With regard to PATH, personally, I don't think that the PATH results from a few years ago stand up particularly well to recent numbers. Recent high returns of fish, NMFS direct measurements of very high survival through the Snake River for spring migrants, measures of "D" values, as they call them, how well-transported fish do relative to in-river migrants. Those are all much more optimistic in terms of short-term survival than what PATH for the most part used, something that would need to be addressed if one were to try to revisit and reincorporate PATH stuff into the BiOp and so forth maybe.

Finally, if the ocean regime shift has happened—and 2 years of data don't a 20- or 30-year trend make, but if it has, it also casts some doubt on whether or not the delayed mortality or extra mortality and so forth is really due to the dams, or was it just due to ocean conditions. At this point, we don't know, but I think it's something that we'll be able to find out some more about over the next 5 or 10 years.

BiOp actions, flow augmentation, at least for spring migrants, has very little support in my opinion based on NMFS's research. It just doesn't seem to make much difference how much flow there is in the springtime when it comes to survival for steelhead and spring chinook. For fall chinook, it certainly makes a difference, but it's hard to tell what exactly makes a difference. Is it the time of year? Is it the age of the fish when they release them? Is it the temperature of the water or how much flow there is? You can't really separate it out based on results to date.

The BiOp places a lot of emphasis on offsite mitigation, and that's going to take an enormous amount of monitoring and evaluation to figure out whether or not those things work. One thing that the BiOp doesn't talk about much, but I personally think has a lot of promise, is what they call carcass or nutrient supplementation where they put either literally fish carcasses or inorganic fertilizer out there to see if the juveniles do better.

You noted earlier that the survival of fish from spawning down to the first dam seems not to have changed much, and that may well be true. However, if those fish are smaller, less fit, less ready to go, less ready to make it in the ocean because they're not getting enough to eat when they're small, that could really make a difference and certainly in other species, especially along the Oregon and Washington Coast and B.C., it's made a lot of—those sorts of

programs make a lot of difference—or it made a lot of difference in the past for fish.

Finally, I think that given the variability, the uncertainty, or just plain ignorance of how fish work, why ocean conditions—why cooler ocean conditions are better and so forth and so on, we need to be really humble about our ability to predict what's going to happen in the future at all, let alone what the effect of a particular management action or a set of them are going to be. That's all.

Senator CRAPO. Thank you very much.

Mr. Dreher.

STATEMENT OF KARL DREHER, DIRECTOR, IDAHO DEPARTMENT OF WATER RESOURCES, BOISE, ID

Mr. DREHER. Good morning, Mr. Chairman. My name is Karl Dreher. I serve as the director of the Idaho Department of Water Resources, a position that I've held since 1995. I appreciate your invitation to testify at this hearing and would like to share with you some of my concerns with the draft biological opinion on operation of the Federal Columbia River System released by the National Marine Fisheries Service this past July.

My comments will focus primarily on two aspects of the Draft Biological Opinion. No. 1, the inadequacy of the science relied on by NMFS in continuing to call for flow augmentation in the mainstem of the Snake River. No. 2, the flawed analysis conducted by NMFS in assessing the effects of the Bureau of Reclamation projects in the Upper Snake River Basin, a subject that you alluded to with the last panel.

First, in terms of the flows, if you look at the history of recorded flows at the site of Lower Granite Dam, the striking conclusion that can clearly be drawn is that despite the increasing development of irrigated agriculture in the Snake River Basin, despite development of municipal and industrial water supplies, despite the upstream development of hydroelectric power plants, despite the construction of Dworshak Reservoir for flood control, and despite the construction of Bureau of Reclamation storage reservoirs in the Upper Snake River Basin, flows simply have not changed significantly.

During the spring target flow period established by the National Marine Fisheries Service, average daily flows range from about 50,000 CFS to about 170,000 CFS. They do today. They did prior to 1920. Similarly, during the summer target-flow period, average daily flows range from about 20,000 CFS to about 70,000 CFS. Again, they do today and they did prior to 1920.

The lack of dramatic change in flows is significant because regardless of the flaws or lack of flaws with the process for analyzing and testing the hypothesis model, that process concluded that the productivity of Snake River spring/summer chinook populations remained healthy through the 1950's and into the 1960's. Consequently, changes in Snake River flows can't have contributed to the loss of salmon productivity because the flows didn't change, and it should not be expected that increasing flows will significantly improve salmon productivity because there's no significant flow depletion to contribute to loss of productivity.

What has changed since the construction of the last four dams on the Lower Snake River is the average velocity of river flow, and that has slowed dramatically on an order of magnitude. The slowing of river flows following construction of the lower four Snake River dams coupled with observations that improved adult returns are generally associated with good water years during juvenile migration have led to the hypothesis, and it's only on hypothesis that augmenting flows in the mainstem Snake River will increase flow velocities, decrease the travel time of outmigrating smolts by pushing them downstream and thus improve their survival.

However, there has been little recognition by NMFS in the draft BiOp and the supporting documents that flow augmentation can only at best provide small and insignificant increases in flow velocities. In part, to test this hypothesis, NMFS, the U.S. Fish and Wildlife Service, and the Nez Perce Tribe investigated migration characteristics of hatchery-raised spring, summer, and fall chinook in the Snake River using hatchery-raised juveniles as surrogates for wild juveniles.

The studies were conducted during the period from 1995 through 1998 and showed that estimated survival from points of release to the tailrace of Lower Granite Dam could be correlated with all three environmental variables examined, and those were—consisted of flow rate, water temperature, and turbidity. At least for fall subyearlings they could demonstrate these correlations.

Estimated fall subyearling survival decreased throughout the season as flow volume and turbidity decreased and water temperature increased. These correlations have been used by NMFS as the primary basis in the Draft BiOp for the continuation of flow augmentation from reservoirs in the Snake River and Clearwater River basins to aid outmigrating juvenile subyearling fall chinook salmon.

However, an elementary principle of statistics is that correlation between variables does not equate to cause and effect. Based on an analysis of the 1995 through 1998 data relied on by NMFS, these data do not support a conclusion that higher flows achieved by use of flow augmentation cause an increase in survival.

Attached to my written statement is a copy of the executive summary from a recent collaborative study completed by the Idaho Department of Water Resources; the Idaho Water Resources Research Institute, which is an arm of the University of Idaho; and the Idaho Department of Fish and Game. Using the 1995 through 1998 data relied on by NMFS, we found that most of the hatchery-raised fall chinook surviving to Lower Granite Dam traveled faster, not slower, during lower flows. This is shown in my written testimony, and it's completely opposite of what would be expected if incrementally higher flow velocities caused an increase in survival.

The inadequacy of the studies used by NMFS to investigate survival under varying flow conditions does not suggest that flow, specifically the attributes of flow—water velocity, temperature, and turbidity—are unimportant to migration and survival of juvenile salmon. However, flow rates, velocity, temperature, and turbidity are closely correlated within one another within the 1995 to 1998 data set used by NMFS to justify continued flow augmentation in

the draft BiOp. The current data are insufficient to allow delineation of the effects of individual attributes of flow.

Understanding the effects of individual attributes of flow, particularly the usefulness of flow to compensate for the effects of reservoir impoundment, is fundamental to determining the effectiveness of flow-augmentation efforts for increasing survival of juvenile salmon. For example, if cooler water temperatures are important to improve the survival of juvenile subyearling fall chinook salmon, then using relatively warm water from the Upper Snake River to augment flows may be counterproductive and may actually harm subyearling fall chinook if river flows augmented with water from the Upper Snake River Basin are warmer than what would have occurred without flow augmentation from the Upper Snake.

Mr. Chairman, for that reason perhaps, or another, I note that in today's issue of Clearing Updated, as I said, today, November 20, 2000, it's reported—and I haven't seen this report yet myself, but it is reported that NMFS scientists last week presented research in Portland that found an inverse relationship between spring flows and fish survival. I haven't seen this work myself. It was apparently written in an October 26 memo, and it's yet to be reflected in what the policymakers of NMFS have done.

I see that my time is up. Let me shorthand my comments on the bureau effects, and if you wish to followup with questions, I'll respond. The main problem with the analysis that NMFS did dealing with the effects of the upper Snake projects that the Bureau of Reclamation has constructed is they assume that the depletions associated with the bureau projects occurred during the migration season of the salmon when, in fact, the depletions, as indicated earlier this morning by Mr. Rigby, the depletions to storage occurred in the wintertime and the spring months, not when the salmon were actively migrating.

Instead of recognizing that fact and also recognizing the contribution of return flows, what NMFS did is they assumed that the consumptive use associated with the irrigation caused the deletion when, in fact, the depletion had already occurred and was outside the window of importance to the salmon. Also, in their base study, there's a serious misconception in that without the bureau-depletion scenario, NMFS eliminated all irrigation storage, diversions, and return flows.

This predevelopment scenario stretches the available data and analytical tools well beyond their reliable use and places the entire analysis well into the realm of speculation. Unfortunately, NMFS then took the analysis one stunning step further. It assumed that the bureau reservoirs would remain in place and would be actively employed solely to augment flows for salmon. In other words, NMFS calculated the effects of operating the bureau projects on stream flow as the sum of: No. 1, the depletions that NMFS attributed to bureau-based irrigation and then, No. 2, the volume of water that would have been available if the bureau reservoirs were actively operated solely to augment flows. That concludes my remarks, Mr. Chairman.

Senator CRAPO. Thank you.

Mr. Thurow.

STATEMENT OF RUSSELL THUROW, FISHERIES RESEARCH SCIENTIST, ROCKY MOUNTAIN RESEARCH STATION, BOISE, ID

Mr. THUROW. Thank you, Senator Crapo and members of the subcommittee. I appreciate the opportunity to testify today. I'm Russ Thurow, a Fisheries Research Scientist with the Rocky Mountain Research Station, and my comments today do not represent the Forest Service or the Administration's position.

I find the approach outlined in the Biological Opinion flawed, and today I'd like to focus specifically on the scientifically-indefensible conclusion that Snake River anadromous fish stocks can be recovered through restoration of freshwater spawning and rearing habitat. As detailed in my written testimony the preponderance of evidence illustrates this approach will fail to meet recovery goals for Snake River stocks. I will use wild Middle Fork Salmon River stocks to illustrate why that approach is infeasible since I'm intimately familiar with those populations.

Focusing on restoration of freshwater spawning rear habitat will not recover Snake River stocks because, first of all, losses in the egg-to-smolt stage have not been the cause of the declines. The number of young salmon recruits produced per spawning adult has remained fairly consistent or slightly increased since the 1960's, as was discussed earlier.

Comparisons of stock trends in wilderness and degraded habitats also corroborate that changes in spawning and rearing habitat quality have not been responsible for stock declines. Chinook salmon redd counts in both wilderness and degraded habitats have similarly declined since the mid-1970's.

Second, habitat conditions in the Middle Fork have remained the same or improved since the 1960's. The 1980 wilderness designation banned all dredge and placer mining. Livestock-grazing management has improved in tributaries outside the wilderness boundary, and the Middle Fork supports immense and high-quality spawning areas that I invite the members of this committee to go visit.

Third, in high-quality habitats like those that exist in most of the Middle Fork drainage, there is virtually no opportunity to substantially improve egg-to-smolt survival of fish spawning in the wild. This science article that was mentioned earlier by Kareiva and others emphasizes improving egg-to-smolt survival to restore stocks without considering the feasibility of actually achieving those improvements, and I would challenge the individuals who are advocating freshwater habitat restoration as a means to restore Snake River chinook salmon to visit the Middle Fork habitats and explain how they would achieve a 2.7-fold improvement in survival, which is what PATH says is needed to restore these populations.

Fourth, the life stage where the largest increases in mortality have occurred as a result of human activities is in the smolt-to-adult stage. Return rates have declined from an estimated 4 percent or more in 1968 to less than 0.2 percent in 1992. Comparisons of downriver stocks with Snake River stocks corroborate the strong influence of migration corridor mortality. Snake River stocks above eight dams are faring about one-third as well as stocks—downriver stocks above three dams.

As further corroborative evidence, during years of higher flows and improved passage conditions, differences in mortality rates between downriver and upriver stocks tend to narrow. So if freshwater habitat quality or even ocean condition fluctuations were the proximate causes of mortality, the shrinking of the differences between upriver and downriver stocks with higher flows would not be expected.

The four points I just mentioned clearly illustrate the changes in the egg-to-smolt stage in freshwater spawning and rearing habitat are not responsible for declines in Snake River stocks. Rather, the declines since the mid-1970's have been caused by increased mortality in the smolt-to-adult life stage. The problem lies not in the quality of spawning areas but in the lack of sufficient numbers of adults successfully returning to spawn. Consequently, freshwater habitat restoration will not recover Snake River stocks.

A National Marine Fisheries Service document, the so-called All-H paper provides the final supporting information to illustrate why Snake River stocks will be not be recovered by freshwater habitat restoration. The All-H paper prioritizes subbasins for habitat restoration based on need and opportunities for success. Not a single subbasin supporting Snake River anadromous stocks was prioritized for habitat restoration. Why? Precisely for the reasons stated earlier, because most of the subbasins already support habitat of good, high quality. In fact, the document said approximately 70 percent of the habitat for listed species currently lies in wilderness or roadless areas, so only modest benefits would be realized from freshwater habitat restoration efforts.

In summary, the biological opinion makes a critical error focusing on the egg-to-smolt life stage as the area of emphasis. This approach is not feasible and will fail to recover Snake River anadromous fish. If Snake River anadromous stocks are to be recovered, then the biological opinion must change its approach and emphasize measures to restore survival in the smolt-to-adult life stage to a level necessary to meet recovery goals. Thank you.

Senator CRAPO. Thank you very much, Mr. Thurow.

I'm going to ask some general questions for the whole panel. I would just like you to feel free to jump in and discuss these issues with me. But I want to start out with a question that I discussed with the previous panel, and I'm just going to hold up—there's the two scientific reports that I talked about earlier. There's the Kareiva, Marvier, and McClure report from NMFS, which says that it's the potentially egg-to-smolt cycle where most bang for the buck can be achieved. There's the response to that that says that cycle hasn't been downgraded for decades and that's not where we're going to get the success.

I know from your testimony where some of you come out on that issue, but I would just like to ask you generally, in this whole debate over whether our best success can be achieved in terms of focusing on the egg-to-smolt cycle or the smolt-to-adult cycle, do you have an opinion on that? I guess I would just like to go through all four of you and see if you have an opinion, and, if so, what it is.

Mr. Anderson.

Mr. ANDERSON. I think that the information on the smolt-to-adult returns over the years has shown the greatest variation. In the 1960's 2 to 6 percent of the Smolts returned as adults. In the mid-1990's, they were on the order of a half percent or less. That seems to me where the greatest variation is, and that suggests where the mortality is great.

Now, that doesn't mean that that's where stress is occurring, though. That's why you probably find, as I do, science quite frustrating, because we can't find mortality in the hydrosystem or in the freshwater environment. We think considerable mortality occurs after the hydrosystem and is out of our control, but we can always make arguments that it's due to stress in the fresh water so it is in our control. Until we can resolve that, whether it's due to the size of the fish in the freshwater environment, stress in passing with barges or through the hydrosystem, or if it's due to disease because of interactions with hatcheries, until we can find or discard those things, we're not going to be able to resolve where to put our efforts.

Senator CRAPO. Mr. Paulsen.

Mr. PAULSEN. Certainly, there's been an enormous amount of variability in survival from smolt at Lower Granite back to adult at Lower Granite over the past 25 or 30 years, no question about that. How much of that is anthropogenic, how much of it is just ocean effects, I don't think anybody knows for sure at this point. I agree with Russ Thurow's point that the freshwater habitat for many of these stocks is in good shape. That does not, however, mean there's nothing you can do.

I really think the possibilities for carcass nutrient whatever additions are quite high if that would, for example, help explain why you get this—what they call depensitory mortality, where at very low numbers the survival gets even lower than it was at moderate numbers of fish, and those techniques where you basically add hatchery carcasses or just plain fertilizer to the watersheds have proven themselves in other areas. It hasn't been tried to any great degree in the Snake at all. So, sure.

Ocean conditions, there's nothing we can do about those other than monitor them, I think. There may be a little bit you can do in terms of when the fish get to the estuary in a transportation program or something of that sort, but those are beyond our control. Let's see what we can do because, of course, the basic point from the Kareiva et al article was that even if you make hydrosystem survival 100 percent, no mortality at all, that's not going to be enough by itself to bring the stocks back.

They were just looking at this and saying, "Well, where could we possibly do something?" It looked to them like the only other place to look was very early in the life cycle either when the fish are still rearing in freshwater or when they're down in estuary, just out in the ocean.

Senator CRAPO. Mr. Dreher.

Mr. DREHER. Mr. Chairman, as you know, I'm not a fisheries biologist, and so I, with your permission, would defer answering the question because I believe it's outside the realm of my expertise.

Senator CRAPO. I understand.

Mr. Thurow.

Mr. THUROW. A couple of points. To me, the issue of discretionary mortality is a really critical one, and what I mean by that is where in the life stage have there been changes in mortality attributed to human activities, so where do we have the discretion to do something about those?

My point is that in these high-quality habitats—and I would disagree with Mr. Schiewe about the condition of the Middle Fork. I'm very familiar with that drainage. I've worked in it for 20 years. I've walked virtually every mile of spawning habitat accessible to anadromous fish, and the only drainage in the Middle Fork where we have opportunities for improving habitat condition is in Bear Valley Creek. The rest of that drainage is in very high-quality condition. Some of the areas he mentioned are actually outside the wilderness boundary, but Marsh Creek, for example, still has very, very high-quality habitat.

So having said that, we do not have the opportunity for changing mortality in those areas. There has not been the change attributed to human activity so there isn't discretionary mortality. The Kareiva, et. al paper, basically, my understanding what they did and what CRI did is to look at the whole life cycle of salmon and say where is the mortality apportioned and where do we have some chance of doing something. So they looked at the first year of life, and, not surprisingly, that's where most of the mortality occurs.

These fish produce between 4,000 to 6,000 eggs per female. In basic biology, we learn that the bulk of those are not going to survive. Survival is variable, but even in the best environments, the bulk of those fish are not going to survive their first year. There's a variety of reasons for that. To me, the biggest weakness of the Kareiva and the CRI work is that they don't look at the feasibility of it. Yes, most of the mortality occurs there, but what can we do about it? We really can't do much in high-quality habitats.

I would also like to comment on Charlie's point about fertilization. I struggle with that a little bit for two reasons. Because, No. 1, my familiarity with the Middle Fork stock suggests that, although we do have low nutrients, much lower nutrients than we had historically because the great declines in stocks, the chinook parr and the steelhead parr that are in that system are in phenomenal condition. They're athletes. Those fish are taking advantage of the food that's there. The seeding rates are so incredibly low that in areas where we used to have clouds of chinook parr, now you see three or four fish.

So the fish that are there, from my perspective, are in good condition. They're not suffering from bad conditions. If we hypothesize that there is an effect from lack of nutrients that we might have a positive benefit on, though, what that causes us to have to do is to hypothesize that there's actually delayed mortality that's skipping a life stage. What we see is the spawner to recruit numbers are staying fairly flat or increasing. That would suggest that the fish in the freshwater environment are not suffering from low nutrients.

The hypothesis, then, would have to be that somehow they're in worse condition so when they become smolts and migrate, that's reducing survival, and, personally, I have a hard time believing that. It's also interesting to me that some of the scientists that aren't

very comfortable accepting the notion of delayed mortality through the hydrosystem would accept delayed mortality skipping a life stage.

Senator CRAPO. Your answers to this question have raised a lot of issues for me. I want to kind of step you through what I'm thinking right now as I'm listening to you and make sure that I haven't reached any conclusions that you didn't intend for me to reach or that you don't think are justified.

First, in terms of looking at the life cycle, what was it, 95 percent of the eggs don't make it through the first year; is that the statistic that's generally accurate? The question, then, is whether that's not normal or whether what we are calling discretionary mortality or human-caused mortality is occurring in that 95 percent loss of egg to smolt. Do any of you on this panel believe that that's not normal? In other words, is there a lot of room to improve that survival rate over what it is in nature? Is my question making sense?

Mr. PAULSEN. I suppose it depends on how you define "a lot." Are modest improvements possible? Could we drop the 95 percent to 94, 93 or something like that? If we knew what we were doing, maybe. By the way, if it sounds like I'm proposing this carcass or nutrient stuff as a panacea, I'm not. I'm just saying I think it's something worth trying to see what happens. I don't think you can reduce it to 1 percent or 5 percent from 95 percent or anything like that.

Senator CRAPO. So would any of you say that I've made a wrong conclusion here if I concluded that this 90-percent plus, 90 to 95 percent of the eggs are going to be lost because that's how it works in nature and it's not being caused by human activity? I'm assuming that I'm OK with that conclusion.

I also thought I heard in your answers, collectively, that most of the actual mortality as opposed to whether it's from a previous cause, but most of the actual mortality is actually occurring once the fish gets out of the river system and into the ocean. Is that true?

Mr. ANDERSON. To maybe qualify that, the greatest variations in the life-stage mortality is in that section. Part of it is because we can measure that. We know how many smolts go out. We know how many adults come back and that's where we see biggest—a huge variation.

Senator CRAPO. OK. Well, any other responses to what I just said?

Mr. THUROW. I guess I would clarify what I think you're saying is most of human-caused mortality seems to have occurred in that smolt-to-adult stage; is that what you're saying?

Senator CRAPO. What I was getting at is if we could measure how many fish die at each point of the—I'm not sure I want to say the life cycle because the life cycle from smolt to adult is 5 years or is a long period of time, and it includes the river system plus the ocean. But if we could divide it into the river system from when they leave their habitat—their spawning habitat and get to the ocean, and then what happens in the ocean, when does most of the actual mortality occur? Does it occur in the river or does it—a human-caused mortality in the river—or does it occur in the ocean regardless of what caused it?

Mr. PAULSEN. Are you saying human-caused mortality? I'm getting confused. Human-caused mortality regardless of what caused it?

Senator CRAPO. Right. Regardless of what caused it. I want to know when the death occurs.

Mr. ANDERSON. Well, the measurements we have through the hydrosystem are 50 percent mortality, and that's about what it was before the dams went in. After that, there's maybe a 1 percent survival after that point.

Senator CRAPO. In the ocean?

Mr. ANDERSON. In the ocean including the estuary.

Senator CRAPO. Let me interrupt. Before the dams went in, there was a 50 percent survival through the river system?

Mr. ANDERSON. It was maybe higher. Before the Snake River dams went in, when there were four dams in the system, it was not much different than what it is right now.

Senator CRAPO. With eight dams?

Mr. ANDERSON. With eight dams.

Senator CRAPO. So what I interpret from that—what I hear from that is that it hasn't changed significantly with the additional four dams being put in. That doesn't mean that they aren't causing mortality. It just means that the mortality, if they are causing it, is occurring after they get to the ocean. Am I right about that?

Mr. ANDERSON. You are right about that.

Senator CRAPO. Any disagreement with that?

Mr. PAULSEN. One caveat that Mike Schiewe mentioned this morning is that in the 1970's as the dams were going in, things were just terrible for in-river migrants. One thing he didn't say is, for example, they used to shut the Snake River off at night when power demand went down. It doesn't work that way anymore.

Senator CRAPO. So we don't really have a good gauge as to what it would be.

Here's a question: Do we know without dams in the river what the mortality rate would be in terms of fish transferring itself from the habitat to the ocean?

Mr. PAULSEN. Certainly, not from direct measurements, no. There are certainly people who are willing to make a guess at that. Almost everybody, I think, would say it would be higher than it is now. It would be higher than the 50-odd percent that it is now.

Senator CRAPO. Higher survival.

Mr. PAULSEN. Yes.

Senator CRAPO. But we don't know how much. That helps.

I guess I still have a question. What I'm leading to here is how we are going to figure out this question of delayed mortality or human-caused mortality and how we can study it to get an answer to it because we have—I think that we have some pretty good evidence—at least from what I've seen so far, there seems to be pretty strong evidence that the habitat issue is one where just because of nature, that's where the biggest losses occur, and we have pristine habitat where we still have problems, and so there's obviously something else going on.

But then that something else is the question, and there are strong advocates who say that something else is the river system and the hydrosystem in particular, and there are strong advocates

who say that something else is the ocean climate circumstance that we see cycled back and forth. I suspect there's probably some truth in both. The question is how much of a factor are those two, and then some say to me when I posit that question, "Well, we can't do anything about the ocean and so we might as well focus on the hydrosystem because that is something that we can focus on and can do something about."

But the question I then have about that is if they're equal components, that makes sense, but if the ocean is 90 percent of the problem and the hydrosystem is 2 percent of problem, you're not really solving a lot if you just focus on it that way. On the other hand, if there are different ratios in there, then maybe the decision as to what to do and where to focus your efforts makes more sense.

So, I'm trying to get, as a policymaker, a perspective on what the relative impact of different parts of the equation are, whether it be the hydrosystem, the predation, the ocean climate conditions, or whatever, how those fit together. Do we have any ability as scientists to answer those questions yet? Do any of you dare to even get it as simple as saying whether the ocean is a bigger factor than the dams?

Mr. THUROW. I'll address that a little bit. I'm stepping out of a box into an area that I haven't done specific work in because my strength is in the freshwater-habitat arena. That's where I have the knowledge and experience. Obviously, there's strong evidence for cycles, productivity cycles in the ocean. But these have probably been occurring for hundreds of thousands of years, and salmon and steelhead have persisted through those cycles. Those cycles are working in concert with these other factors, these other human-caused factors.

But for the ocean conditions to be the proximate cause of declines in Snake River stocks would require a couple different things. First of all, it would require that there's an ocean phenomenon that's specific to Snake River stocks, and it's a phenomenon that was coincidental with but unrelated to the hydrosystem. My understanding is that the first year of ocean residence is believed to be the big driver in survival of smolt-to-adult return so—in determining your class strength, and that's one of the reasons why we use what we call jack counts to estimate the next year's returns because there is that strong relationship with first-year residence.

The evidence that I'm familiar with suggests that Snake River stocks and some of those downriver stocks that showed very different levels are using similar areas during that first year of life. So that would be an argument against this specific ocean—this ocean phenomenon specific to Snake River stocks.

The other argument is that the shrinking of the differences between up- and downriver stocks during years of better passage conditions would also suggest that it's the migration corridor and not the ocean conditions that are responsible for the differences in those up- and downriver stocks.

So I guess my view of the ocean is certainly important. Certainly, the ocean productivity is going to determine the rate at which stocks decline or improve, but looking at all the data, I find it really difficult to say that the declines of Snake River stocks have been caused by ocean productivity changes when we have measured

changes in smolt-to-adult return rates of that magnitude. We know that 1968 we were in the 4 percent smolt-to-adult range, and we know that it's declined, as he said, less than a half percent in many years.

Senator CRAPO. Mr. Anderson, Mr. Paulsen, do you have a perspective on that?

Mr. ANDERSON. I have a perspective. We dealt with this in the PATH process. We had a couple of alternative hypotheses, one that was related to hydrosystem, one that related to ocean, another that was disconnected from all of those. Looking at the information, we found there were some critical data points, two or three which would drive you one direction or another in your conclusions. We did not have enough information to be able to separate out if those critical data points were important.

We now have a little bit more information that our assumptions on the mainstem hydrosystem survival were too low. The new information indicates we have higher survival, so that will change our analysis, which we have not done. We have not looked at that. We still have some uncertainties about the comparison data sets we were using. We were using lower river stocks from the John Day, principally, which drove a lot of the conclusions. We didn't look at stocks from the Upper Columbia, which were declining independent of any changes in their hydrosystem passage.

I think that we cannot resolve this issue with simple logical scenarios. We have to take a wider look at the different stocks using the available data we have, and, hopefully, we will also look at some of the conditions of the stocks. As Dr. Schiewe was pointing out, they're going to look at survivability depending on passage route of fish after they've left the hydrosystem. Putting all those factors together, over the next decade, we might be able to resolve this, but I just don't believe any logical scenario arguments are going to be sufficient because we can come up with so many of them right now.

Senator CRAPO. Mr. Paulsen, before you answer, I want to followup here. What I'm hearing from you—and I've kind of been picking this up from a number of things said here today—is that we don't have the ability to know the answer to some of these critical questions yet. Given the fact that we're looking at a BiOp that gives us 5 or 6 years to know before we're going to face another very critical decisionmaking point, do we have time to get some of the answers you just said we had to study and find out in that period of time?

Mr. ANDERSON. Not in 5 years.

Senator CRAPO. So in 5 years when we make this decision, we're going to be sitting here with the same questions being asked and the same answers being, well, we don't know; is that right?

Mr. ANDERSON. We could, yes.

Senator CRAPO. Mr. Paulsen, do you want to elaborate?

Mr. PAULSEN. I'd say it depends on what we do in the meantime. Certainly, things that depend on kind of gradual responses for large numbers of stocks, like all of the Snake River stocks all at the same time, we haven't a prayer of finding out very much more in the next 5 years. One thing that might happen is, again, if an ocean regime shift has occurred, the smolt-to-adult return rates

may well go up substantially for Snake River stocks and probably others as well.

If that happens, it casts some doubt, at least, over the dams as the cause of this extra mortality. In addition, if you can do experiments that affect different stocks differently, so you put carcasses out over here and don't put any out over there, or you improve this habitat but don't do anything to that, then you may be able to find some things out in 5 years or so. But other than that, I agree. I think it's going to be a while.

Getting back to the—was it the dams; was it the ocean, I spent—I and other PATH members spent a lot of time trying to tease this out of the existing data, and in different ways and in different degrees, we all kind of gave up after a while. They didn't put the Snake River dams in as an experiment. They happened to go in when lots of other things may well have been going wrong with the Snake River fish. The same for dams and hatcheries and so forth and so on everywhere else in the Columbia. It's really tough to disentangle that in a way that you can say for sure, yes, it was the ocean and not the dams; it was the habitat and not the hydrosystem or whatever it may have been. It's a tough nut to crack.

Senator CRAPO. Mr. Paulsen, on a related point, you state in your testimony—or you stated concerning your testimony that monitoring efforts will be too broad, too general, and too diffuse to be effective, and I think you recommend some more closely monitored specific management approaches to this. Could you recommend or tell me what have you in mind there?

Mr. PAULSEN. Well, in a general sort of way, sure. The All-H paper in particular calls for monitoring just about every phase of the life cycle for a great many stocks, and my main concern is that between dollar constraints and just practical ones, that there aren't but so many people who know how to do this and such, that we may wind up just monitoring everything that swims or creeps or crawls because almost anything could be related to how well the fish are doing, whether or not a management action is working and so forth.

All I'm trying to say in my written testimony is to try to focus the monitoring on the effects of management actions taken under the BiOp to see if those actions work. Does spring flow augmentation, summer flow augmentation, do those have the effects that the BiOp says they will? Does increased spill at projects really result in increased survival at those projects? Do habitat-enhancement actions, whatever they may be, have the effect that people—have at least a positive effect, let alone a specific effect, that people think that they will? Because, otherwise, like I say, we may just run out of people, run out of money, run out of time doing this.

Senator CRAPO. Would you support the spread-the-risk approach that has been advocated where we have more of a balance between transportation and spill or other types of passage at the dams and then studying those perspectives?

Mr. PAULSEN. I think if and only if you really monitor those closely. Tag lots and lots of fish. Release them via lots and lots of different routes and so forth and so on because if what you really want to do is find out quickly whether or not transportation is bet-

ter or in-river survival is better for fish, the really easy thing to do would be to transport everything you catch in, let's say, odd-numbered years and let them all go in even-numbered years and see how they do a few years later when they come back. That would give you far more contrast than the sorts of——

Senator CRAPO. Fifty-fifty.

Mr. PAULSEN. Than the 50/50 that's being pursued now.

Senator CRAPO. Mr. Dreher, I know that you're not a fish biologist so you haven't participated in a lot of this, but I do want to talk to you for a moment about the research that you've done with regard to water augmentation. I've seen your charts. I've got your testimony here with the charts that are in them. But as you indicate, the amount of water that is provided through flow augmentation in comparison to the flows in the river, both rivers, when you put that chart up, it just dramatically shows how insignificant that contribution is, and you've indicated that the amount of flow historically, whether you look at it from decades ago through now, has not changed.

Is it fair to say that even if the flow augmentation that is being proposed were done, that it wouldn't change those charts very much, that you would still have the same levels of flow, in essence, very minor variations?

Mr. DREHER. That's correct, Mr. Chairman. The water that's placed in the system through flow augmentation, once it's in the system it's so insignificant we can't even measure it. We can't even find it. We know what we're putting in, but if you were to go downstream and measure the flows without—with flow augmentation and without flow augmentation, you wouldn't be able to measure it.

Senator CRAPO. That's even in comparison to years when there was no storage and you just measured the flows when it was all going down the river normally; correct?

Mr. DREHER. That's correct, Mr. Chairman.

Senator CRAPO. Tell me what your charts explain once again about the impact of flow augmentation on particle velocity.

Mr. DREHER. We can detect some change in average velocities associated with flow. At least we can calculate some change. I should put it that way. But the velocity improvements are inconsequential. If velocities have slowed by an order of magnitude—which they have. It's a factor of 10 or better—and flow augmentation makes a 5 percent improvement, that's pretty insignificant. That's about the range of scale that we're talking about. It's a very few percent improvement in average velocity trying to compensate for an order of magnitude change, and it's too little. It's not enough to make up for the slowing if that slowing has been significant.

But as I pointed out in my testimony, at least, based upon the current data set available—and other data sets may shed some more light on this—but flow—when the fish are ready to migrate, flow does not seem to be that important. The reason we can conclude that is because, as I indicated, most of the surviving fish in this PIT tag study, they migrated faster under lower flows than they did under high flows, and that's just totally opposite to what you would expect if flow velocity was a significant factor in migration.

Senator CRAPO. Thank you. I think we've gotten through this before, but I wanted to be sure. This is to fish experts on the panel. The question of whether the first year survival rates have changed much over time—well, changed much since the dams were put in is a critical question, I think, and I want to be sure. I'm operating under the assumption that there's really not much disagreement that the first-year survival rates have not gone down since the dams went in; is that correct?

Mr. PAULSEN. With, I think, one caveat. As a scientist, what I would like to have seen is experiments—measurements conducted exactly the way every year for 20, 30, 40 years. Of course, that isn't the case. The dam configurations have changed, the hardware, the bypass systems, and so forth, and so I suspect that it probably is true, in fact, that those haven't changed very much, but to say that they haven't changed at all or that they're exactly the same now as they were 40 years ago is probably stretching the data a little too thin.

Senator CRAPO. Would any of you disagree with the conclusion that even though the highest level of mortality is in the first year of life of salmon, that the most bang for the buck, in terms of what we can do to impact human-caused mortality, would be in the smolt-to-adult cycle regardless of whether we're talking about ocean conditions or hydropower issues or whatever?

Mr. THUROW. I would say qualify that with where you have good habitat, yes. If you have degraded habitat, certainly there are some opportunities. In places like the Lemhi and the Yankee Fork, there are some opportunities to improve first-year survival, but where you have good-quality habitat, I think that statement is accurate.

Mr. PAULSEN. I'll put in a plug for carcass nutrient.

Senator CRAPO. Mr. Anderson agrees?

Mr. ANDERSON. Yes.

Senator CRAPO. I have no further questions for this panel. I would like to thank you for your participation today and the information. Your testimony has been very helpful.

We have one final panel. However, I've been asked to have a brief break here for probably 15 or 20 minutes, and so we will take a recess, and I'll try to keep the recess to about 15 or 20 minutes so we can keep on pace.

[Recess.]

Senator CRAPO. Mr. Dreher, would you come back up to the table? I know there's something that I was aware you were going to say, and I wanted to hear it, but we didn't get it done during the questioning, and I apologize for that. It has to do with the issue of collaboration and litigation, and I know that you and I have gone over this before, but I wanted it part of the record. So I would like to give you another minute or so to express your position on that.

Mr. DREHER. Thank you, Mr. Chairman. In terms of the collaboration during this process, from my view, the collaboration has been wholly inadequate, and I don't place that criticism on the scientists necessarily. It's probably more fairly placed on the policymakers at National Marine Fisheries Service.

Had there been adequate collaboration, then these scientific inadequacies, at least, that I described could have been addressed before the draft BiOp was finalized. But an aspect of inadequate col-

laboration that often is overlooked is what inadequate collaboration leads to, and that is increased litigation both in length and in scope.

In this particular case, what I'm afraid that will lead to is a delay or diminishment in recovery actions that really could help the fish. That's an aspect of lack of collaboration that I think is often overlooked, but I think it's on point in this particular instance.

Senator CRAPO. I appreciate you being willing to come back up and say that. As you know, I very strongly believe that collaborative decisionmaking is not only better in terms of developing the buy-in of the people who are involved and the confidence of the people in the decisions that are made, but it gives you better decisions, and that means you will have less litigation and so forth.

In this case, I think, if we don't have it, it's going to be worse for the fish. It's going to be worse for the people, for the economy and ultimately it will face us with much more expensive decisions that we will need to face in the future. Thank you very much.

Mr. DREHER. Thank you, Mr. Chairman.

Senator CRAPO. Let me call up the third panel now. The third panel consists of Mr. Dan James on behalf of the Pacific Northwest Waterways Association; Mr. Thayne Barrie, the owner of Sunset Sports Center; Mr. Craig Smith, the Northwest Food Processors Association; Mr. Mark Benson of Potlatch Corporation; and Mr. Scott Corwin of the Pacific Northwest Generating Cooperative.

Again, thank you, gentlemen, for appearing here today. I apologize for the break we had there. It was unavoidable, and I appreciate your patience.

Mr. James, why don't you begin.

STATEMENT OF DANIEL JAMES, ON BEHALF OF PACIFIC NORTHWEST WATERWAYS ASSOCIATION

Mr. JAMES. Thank you, Mr. Chairman. I am Dan James. I'm a government relations consultant with law firm of Ball Janik. Today, I'm representing the Pacific Northwest Waterways Association, where I worked from January 1992 until last month.

PNWA's Idaho members include the Port of Lewiston, Boise Cascade Corporation, Potlatch Corporation, Idaho Power Company, Lewiston Grain Growers, and the Lewis-Clark Terminal Association. We recognize the importance of addressing the salmon science question; however—and we talked a lot about it this morning. However, even though there was 100 percent agreement on salmon science, we would still be faced with the problem of conflicts in law, goals, philosophy. These conflicts, if unresolved, will keep us from success.

Consider the moon landing and the frozen French fry, the polio vaccine, and the cellular phone. In each instance, there were vast uncertainties in the science, wide gaps in knowledge, conflicting data, and a diversity of opinion. Yet, ultimately, those who pursued their goals were successful.

The application of science was successful because goals were clear and priorities were definite. Absent clear goals and definitive priorities, the problems surrounding the recovery of salmon continue in the Columbia Basin. We are attempting to apply science

without clear goals and without definitive priorities. Again, conflicts in law, goals, and philosophy are serious impediments to salmon recovery in the basin. I'll give you a few examples.

It is the responsibility of the National Marine Fisheries Service to protect endangered fish without regard to the economic cost of doing so. However, it is the responsibility of the Northwest Power Planning Council to protect all fish and wildlife in balance with meeting regional energy needs.

The Migratory Bird Act and the Marine Mammal Protection Act and other laws were created to promote a healthy, balanced ecosystem. At the same time, some species we are protecting have increased their consumption of ESA-listed salmon. The Caspian turns in the Lower Columbia River are the best example of this dichotomy.

The ESA gives a highest possible and legal priority to the protection of listed species of salmon. Yet, the United States has trust responsibilities and treaties regarding Native Americans' tribal fishing rights. There are conflicts between protected, weakened—between protecting weakened salmon runs and encouraging the harvest of stronger runs of wild salmon and hatchery fish. There are conflicts between enhancing populations of wild fish and enhancing populations of hatchery fish.

Some who advocate breaching dams are not willing to consider alternatives to mixed stock harvest to protect endangered salmon. This is a philosophical point as is some who advocate massive reductions in water withdrawals that would devastate irrigated agriculture appear unwilling to consider changing hatchery management goals to protect wild salmon runs.

We need to establish priorities, and I offer a few problems to illustrate that point. What do we do when ESA and treaty obligations conflict? What do we do when salmon protection and marine mammal or avian protection conflicts? What do we do when hatchery practices and harvest practices hurt ESA-listed fish?

To date, we have seen the Federal, State, and tribal agencies attempt to meet diverse and conflicting objectives. The Columbia and Snake Rivers support a tremendous diversity of life and bring a remarkable array of benefits to the region and the Nation. The question we have posed to ourselves is this: As users of these rivers, how can we support recovery of listed salmon stocks and preserve the other benefits that these rivers bring to the entire region and the Nation?

As an aside, Mr. Chairman, after listening this morning, I want to recognize the important role that you and the committee can play in ecosystem restoration in the Lower Columbia River estuary, where many believe—which many believe is the key to salmon recovery. This committee can do an awful lot in that regard.

Senator we hope that you and your colleagues will direct the Federal, State, and tribal fish managers to establish a clear and consistent goal that recognizes the complexities of salmon and the river system. If the outcome of that guidance manifests itself in multiple goals, then we must establish clear priorities that lead us to salmon recovery while maintaining the remarkable and important benefits of this river system.

I do appreciate the opportunity to share my views on these issues, and I look forward to answering any questions that you may have. Thank you.

Senator CRAPO. Thank you very much.

Mr. Barrie.

STATEMENT OF THAYNE BARRIE, OWNER, SUNSET SPORTS CENTER, BOISE, ID

Mr. BARRIE. Thank you, Chairman Crapo and members of the committee. My name is Thayne Barrie. I'm an independent businessman as well as president of Idaho Steelhead and Salmon Unlimited. I own Sunset Sport Center with a store here in Boise on the western side of the State as well as a store in Pocatello on the eastern side of the State.

Idaho Steelhead and Salmon Unlimited was formed in 1984 by a diverse group of businessmen, guides, conservationists, sport fishermen, and concerned citizens from throughout the region to protect, restore, and preserve the Snake River's anadromous resource. The Snake River was once the world's largest producer of spring chinook, summer chinook, and steelhead as well as a large number of sockeye, coho, and fall chinook salmon. Snake River salmon contribute to economies as far north as Alaska and as far south as California and 900 miles inland to Stanley, ID.

Members of ISSU claim that they can remember back in the late 1960's and early 1970's when small communities along the Salmon River, such as Clayton, ID, would sell as much as 2,000 gallons of gasoline a day and about that many gallons of beer. In 1978, only 3 years after the completion of the four lower Snake River dams, salmon was closed on world famous Salmon River and has never reopened. Fishing businesses from Alaska to Stanley were devastated by the completion of these four dams. Sport, tribal, and commercial fishermen were the first victims of the result of the damming of the lower Snake.

Because those dams were so lethal to wild salmon and steelhead, Congress acted immediately to protect remaining wild populations by creating the Frank Church River of No Return as well as the Selway-Bitterroot Wilderness Areas to protect and enhance the spawning and rearing for a few remaining wide runs. These two wilderness areas comprise the largest contiguous wilderness area in the lower 48 States. However, this added more victims such as logging, mining, and ranching, which were all but eliminated in these areas all because the dams kill so many fish that no other mortality can occur.

The same trend continues today. The four lower Snake River dams continue to kill so many fish that no other human-caused mortality is acceptable. Sport, tribal, and commercial harvest are a mere fraction of what they were before the dams were built. Habitat such as at Bear Valley Creek, Marsh Creek, and Beaver Creek along the Salmon River, to name a few, are in better shape today than they ever have been, yet the Federal BiOp wants to continue to punish the victims. It is laden with habitat, harvest, and hatchery measures, more of the same stuff that has been done in the basin for 20 years.

Currently, steelhead fishing in Idaho is a $90 million a year industry. It employs approximately 3,000 Idahoans. In rural Idaho, such as Riggins, Challis, and Orofino, it's an important natural resource, one that has far more economic importance than simply restoring them because of the Endangered Species Act. Don Reading of Ben Johnson and Associates estimates that a restored salmon fishery in Idaho would double that number. I know in my own business, salmon and steelhead fishing mean $310,000 a year or 9½ percent of my total business.

When you look at a business such as mine, and we try to hit a net return of 3 percent, that's net, the loss of this revenue would equate to three full-time jobs and two part-time jobs. I cannot even speculate on the amount of nonfishing items that this customer can relate to. Possibly, it would mean the loss of my whole business. You factor that statewide and the effect would be enormous.

Sportfishing in Idaho, Oregon, and Washington, according to the American Sport Fishing Association, showed that $2,993,298,116 was spent in 1996 by sport fishermen, nearly $3 billion in 1 year, or about the same amount that has been squandered in the region by Northwest Power Planning Council on salmon recovery. Bear in mind this figure does not represent tribal or commercial fisheries and was compiled at a time when salmon and steelhead runs were at their all-time low.

ISSU has no agenda for dam breaching. ISSU's agenda is to save salmon. If that includes the breaching of the lower four Snake dams, then that must be. We are willing to support any plan that can pass State, tribal, and legal muster. We have yet to see one that does and nor do we believe we will.

I have included some economic attachments in my packet that the Save Our Wild Salmon has put together. These figures were in the documents derived from the DREW documents.

At this point, if there's any questions, Senator, I thank you for the time and am willing to answer any.

Senator CRAPO. Thank you very much, Mr. Barrie.

Mr. Smith.

STATEMENT OF CRAIG SMITH, NORTHWEST FOOD PROCESSORS ASSOCIATION, SALEM, OR

Mr. SMITH. Thank you, Senator Crapo, and thank you for the opportunity to be here today on such an important topic.

Northwest Food Processors Association is a regional trade association representing the fruit and vegetable and specialty-processing manufacturers in Idaho, Washington, and Oregon. Food processing is the largest manufacturing employment sector in the State of Idaho and the second largest manufacturing employment sector in the States of Washington and Oregon. Food processors in the region operate 257 plants, employ 50,000 individuals and realize a $7 billion in annual sales.

We have a critical interest in the future of the Columbia/Snake system for irrigation water, transportation, and hydropower. Today it seems apparent to us that salmon recovery in the Columbia/Snake is really at a crossroads.

The Draft Biological Opinion really signals the beginning of a shift in direction for salmon-recovery debate. It's a shift away from

dam breaching and toward a performance-based plan. We believe this shift is long overdue even though the BiOp has a lot of problems and still contains many of the same elements of past failed efforts. For too long we believe the region has argued over the big-ticket items, dam removal and flow augmentation. These two issues have been the focus of tremendous controversy and have dominated the public discussion.

Now, the science is becoming more focused and the debate is beginning to shift. I think we're now beginning to understand that the science doesn't support dam breaching or flow augmentation, especially as it relates to Snake River stocks. That's a huge problem for some people who have staked their reputation on breaching and flow augmentation. So now we have the beginning of some different science battles that we believe are going to be very detrimental to the decision in the Northwest.

As we continue to debate whether it should be CRI or PATH—and we realize that all those things have to happen, but the data begins to become clear that there are things that can happen outside this discussion of constantly moving science that needs to happen and needs to happen now. It seems that these debates go on forever with no real resolution in sight, and while we argue and spin, viable and proven effective measures that will really help salmon continue to wait for the region to put its energies into productive recovery efforts.

This is not to say that good things are not happening now, but how much more could we accomplish if we really move beyond these esoteric, self-serving debates?

Mr. Chairman, our industry and the residents of the Northwest that depend on the Columbia River system for their livelihoods have had enough of this endless debate. The uncertainty hangs like a cloud, and combined with difficult times in the agriculture sector, it is having a very negative effect on our industry. For the good of the region, we believe it is time to develop and move ahead with a full recovery plan.

It's time for reason and common sense to merge with science and produce a plan that can be implemented immediately for the benefit of fish and the benefit of the Northwest. That's why we agree with the approach that was taken by the region's Governors last summer to put together a reasoned, well-balanced All-H plan. We believe that that solution can come from the region and that the Governors are the ones who are in the best position to put together and move forward with that type of an approach. Using the science to inform their decisions, the region's Governors can develop a balanced plan that will benefit endangered species.

NMFS and Federal agencies have had 10 years since the first listing on the Columbia/Snake system, and they haven't produced a recovery plan, and, in fact, the performance standards in the Draft BiOp are an attempt to set some goals, which we think are a positive thing, but they mean little outside the context of an overall recovery plan.

In fact, it's our belief that the performance standards and the subsequent requirement for offsite mitigation in the current Draft BiOp have the potential to significantly damage ongoing habitat-improvement projects by forcing dam operators to go into tributary

habitat areas, find projects that they can take credit for, and screw up local planning processes. We've seen this happen in the past, and we believe that it's a very real consequence of this particular BiOp.

We are advocates of performance standards. However, they must be developed for the whole system, not just the hydro operation, and this is not possible because it's outside the scope of the current BiOp. This accentuates the need for a recovery plan.

We believe strongly that we have to eliminate the piecemeal management practices we're now following. Consequently, it's time to end the rancorous debate over flow augmentation from the Upper Snake and the removal of four Lower Snake dams. While these issues continue to polarize the region, the science does not support either alternative. In my testimony I have at length quoted from the Federal documents that we believe—and this is NMFS science, not ours.

In conclusion, Mr. Chairman, we think that now is the time for action, not for continued argument over the nuances of science. The science will never be complete. However, the controversial issues of breaching and flow augmentation, and in between those, there's general agreement on many practical, achievable, and productive salmon-recovery measures, things like limiting pinniped and avian and pikeminnow predation, and continuing to improve mainstem passage through bypass improvements and surface collectors, improving our transportation system, studying effects of ocean conditions, and many things that you've heard from the previous panels, we believe all those things are very productive and should go forward.

Our perspective on this at this point is that now is the time for action. We cannot wait for 5 years to see whether or not we're going to be effective and then default to a strategy that isn't supported by the science. Thanks a lot.

Senator CRAPO. Thank you very much, Mr. Smith. I have read your full testimony. I appreciate that.

Mr. Benson.

STATEMENT OF MARK J. BENSON, PUBLIC AFFAIRS DIRECTOR, IDAHO POTLATCH CORPORATION, LEWISTON, ID

Mr. BENSON. I am Mark Benson, director of Public Affairs for Potlatch Corporation's Western Region. Potlatch Corporation is a diversified forest products company with holdings in Idaho, Arkansas, Minnesota, Nevada, and Oregon. It is our pulp, paper, tissue, and lumber operation in Lewiston, ID, and our 670,000-acre forest land holding in north central Idaho that makes the FCRPS Draft Biological Opinion and Draft Basinwide Salmon Recovery Strategy important to us.

Over the past 20 years, we have developed a significant market for our paper board in Japan and other parts of the Pacific Rim. Our ability to use barge transportation between Lewiston and Portland has been critical to our success in competing in these overseas markets.

Senator Crapo, let me begin my comments by thanking you for your support for allowing all involved to focus on actions that will help the fish while leaving dams in place, while protecting Idaho's

water, and while meeting the needs of Idaho's communities. It is gratifying as an Idaho business with significant dependence on the existing river infrastructure to know we have unanimous support from our entire Federal delegation as well as our Governor.

I also wish to thank you for providing this hearing opportunity for Idahoans to voice their opinions and thoughts about the BiOp and basinwide strategy. As you well know, there are strongly different views of role of the dams with respect to the current condition of Columbia and Snake River anadromous fish, both in terms of the contribution the dams make to the problem and in terms of their potential contribution to the solution. We believe there needs to be recognition of the strengths of BiOp as well as its shortcomings.

Early on, attention was too often focused exclusively on the dams. We think that was wrong, and we're encouraged that both the scientific and the policy focus has expanded to include the entire life cycle of the fish and all of the H's that impact their life cycle. The fundamental premise underlying the Draft BiOp and the recovery strategy paper is that we set aside dam breaching and aggressively pursue a range of other measures to protect and recover listed fish species. We see no better course available for us to take.

We understand that the details of draft proposals leave many areas of uncertainty and debate and that the process going forward will necessarily be adaptive and subject to ongoing improvement. As is often the case, the devil is in the details.

We have concerns about the specifics and the timeframes of the performance measures. As the documents relate to offsite habitat management, we share a strong concern with others in our industry about the growing Federal intrusion into resource management roles that historically have been and should be the province of State sovereignty. We share similar concerns for farming communities of our State who see their dependence on irrigation increasingly at risk of Federal intervention.

We believe, therefore, that the action by Governor Kempthorne, together with Governors of Washington, Oregon, and Montana, in stepping forward to assert a strong State role in the recovery measures that must be undertaken is critical to an acceptable and successful outcome.

My company and the forest products industry are dedicated to fish recovery without interruption of the river system and its amenities, and we believe, based on our interpretation of work done by both government and private sector scientists, that this is realistic. We are committed to working together with Idahoans and others in the Pacific Northwest who are committed to finding solutions to accomplishing this task.

It is important to move forward, and we must move forward. In our opinion, moving forward requires three things. Clear direction for maintaining the existing infrastructure, meaningful and effective measures for recovering fish, and, third, legal certainty.

Mr. Chairman, in conclusion, I would like to thank you for the strong interest you have taken in addressing this hugely difficult and critical issue. We deeply need the help and guidance we have come to expect from you in our collective goal of achieving a suc-

cessful outcome for all of the economic, environmental, and community interests that has so much at stake in this effort. Thank you.

Senator CRAPO. Thank you very much, Mr. Benson.

Mr. Corwin.

STATEMENT OF SCOTT CORWIN, PNGC POWER

Mr. CORWIN. Thank you, Mr. Chairman. I appreciate this opportunity to appear today. I would like to thank you for showing the leadership to hold these hearings to scrutinize these issues that are so critical to our region's environment and economy. My name is Scott Corwin with PNGC Power. We are an energy-services company that's owned by 16 rural electric cooperatives throughout the Northwest, six of them here in Idaho that you would know, Clearwater, Fall River, Lost River, Northern Lights, Raft River, and Salmon River co-ops.

Before commenting on the BiOp and recovery strategy, I would like to take a moment to highlight two important Federal management positions that will need to be filled in the next few months that a lot of us in the energy industry consider critical to fish and wildlife management in the region. One, of course, is the regional director of National Marine Fisheries. The other one is the administrator of the Bonneville Power Administration. I would like to encourage you and your other colleagues in the Northwest delegation to become involved very early as potential replacements are considered.

There are several other important management issues that are closely tied to scientific issues here today. Some of them have been touched on here already. We look at the BiOp and recovery strategy as taking significant steps forward in some respects in trying to look at species recovery in a comprehensive fashion. However, the goals in the BiOp and the recovery strategy fail to address a weakness that has continually hampered fish management in the Northwest, lack of prioritization and lack of reconciliation among conflicting goals, especially in areas such as fish harvest and hatchery production, a point that you made eloquently at the September 13 hearing when you referenced spilling water for fish that later get clubbed.

The recovery strategy needs to make more aggressive strides to ensure that priorities, goals, and implementation of strategies which are coordinated both internally and externally with the Northwest Power Planning Council's program—certainly with the four Governors' outline, which we thought was a very good effort—and the tribal and State programs. While we believe inclusion in the BiOp of the concept of performance standards for measuring results is worthy, many of these standards are incomplete and unevenly applied at this point. In some areas, there remain questions as to whether they are achievable at all. This area needs some work.

On the science, there are many recognized critical uncertainties. Some of those have been covered today already. Delayed mortality, certainly. Importance of diversity, reproductive success of hatchery fish, impact of hatchery releases, estuary ecology, ocean ecology, and even things as basic as counting fish have caused problems with NMFS and other folks doing the research here.

With limited scientific or legal clarity behind drastic actions, such as breaching dams, we fail to see how references to breaching dams or certainly to preliminary design work on that deserve treatment alongside reasonable and prudent alternatives in this Biological Opinion. This does not mean that hydro is off the hook in this opinion, as Mr. Schiewe and Arndt referenced earlier.

The hydrosystem continues to be the major focus of recovery efforts, and it will continue to fund the bulk of the mitigation in the region with current levels of 435 million annually by rate payers, expected to rise by at least another hundred million or more within the context of this BiOp. This includes large investments in infrastructure, continued flow augmentation, and potential enhancements to the spill regimes. But because the best-available science shows that progress has raised hydro fish passage close to the point of diminishing returns, real success for recovery will require looking into other areas of the life cycle. Efforts in the first year of life and in the estuary appear promising as described earlier here.

On budgeting for the BiOp, we're concerned we have yet to see a comprehensive budget for the BiOp and draft recovery strategy that contains real commitments from the many relevant Federal agencies and other regional entities involved here. To be viable, the plan cannot merely be a large blank check to be filled in by the region's electricity customers. We need better accountability than that and we need better monitoring and evaluation of the science to know what we are getting for those investments.

Finally, on power system reliability on the BiOp, I would like to say that while curtailing fish operations during power emergencies should not take the place of good power planning, language should be included in the BiOp that recognizes this need at times to ensure human safety. We would support the request of the Northwest Power Planning Council because of the serious potential in the near future for power supply shortages in the region, it includes language in the BiOp that specifically provides for curtailment of operations for fish in the case of emergencies.

Again, I'd like to thank you for this opportunity and for your continued push for the best scientifically-based solutions to this problem. I would be happy to answer any questions.

Senator CRAPO. Thank you very much, Mr. Corwin.

There's a lot of questions that I have that come from different perspectives to members of this panel, but I think I want to start out with just some broad generalities and get your positions on them.

First of all, let me ask—I assume that none of you are fish biologists. I'm still going to ask you some scientific questions, but I want to be sure that we understand where we are all coming from. You represent from different perspectives, nevertheless, different interest groups who are impacted by the decisions that are made with regard to what direction we will take and what priorities we will establish in the salmon recovery. As a result, you have positions on the science. You've studied the science like I have, and you've evaluated it and have reached conclusions. So I do want to talk about that.

But first, I want to talk about essentially the role of science versus the role of policymaking or establishing goals, trying to clarify conflicts in the law, which is an aspect of policymaking that we need to deal with. I want to make a statement of my own and then ask you to just comment on it, if you could. It seems to me, as I said at the outset, as we develop the salmon recovery plan, it has to be based on good science. I doubt that anybody will disagree with that.

However, the question then becomes, Will the science essentially be a trump card that drives any solution and forces out consideration of other factors, or will the science then be merged by policymakers into a policy decision that takes into consideration economic impacts, job loss, mitigation concerns, cultural impacts, sociological aspects of the issue, and so forth? How do we merge those two? It's a very difficult topic, frankly, to discuss because it's hard to say that if science says you have to do something, that it's not necessarily what society will do.

But even though the Endangered Species Act does not have many provisions in it which contemplate recognition of anything other than what the science drives the decision to mean, what we've learned under the Endangered Species Act—and I think the God squad and the Endangered Species Act was sort of an effort to recognize this—is that when people and jobs and the economy, human element is not considered, then we have strife, political division, and often the political process imposes a gridlock on the decisionmaking process.

So the question I would like to ask in general is, how each of you—if you don't have a position on it or prefer not to state one, you don't have to, but if any of you have a recommendation to me and to this committee and to the decisionmakers in the region who will be evaluating this, what role science has, and how we mix in the economic, human, and political aspects of this difficult decision.

We will start with you again, Mr. James.

Mr. JAMES. I'll take a stab at that. I think that one of the things that science can do is provide us with a menu of things for which we agree and a menu of things in which we do not. I think that one of the things that policymakers—that we would encourage policymakers to do is to find those areas in which there is agreement. Call it developing a suite of options or something else, but develop that list in which there is agreement mostly and move forward on those things. You'll find a tremendous amount of agreement, I believe, within the region among a wide range of stakeholders on the role that ecosystem restoration in the estuary plays, as an example. Let's move forward on that.

Conversely, you find a tremendous amount of disagreement on the issue of breaching dams. It's quite strident, and I believe that that issue can keep us from moving forward on that which we can agree on. As an example, in the coming years, we might be debating funding for preliminary engineering and design for breaching dam and economic mitigation studies at the same time we're debating how to get funding for things like ecosystem restoration. So debating one can keep us from moving forward on the other. That's a great concern.

Senator CRAPO. Thank you.

Mr. Barrie.

Mr. BARRIE. This is one I really don't wish I were in your shoes over. You have two sides of science. Which one do you believe? Science can be melded to whichever opinion you choose to follow.

Senator CRAPO. We've certainly found that.

Mr. BARRIE. Yes. Now, there's a thing called mitigation. That's where I think someone has to look at it from outside the realm of the affected and say we can't have any more victims, I believe, in the issue of transportation by waterway, by water rights. What I think has to happen is there's a tough decision that's got to be made, but with everything that's got to be done, I think there can be a balancing factor in their mitigation with money that is already there and being spent. It's time, like we've talked about in the past, that there doesn't need to be more victims. There needs to be more answers to those problems in making everybody whole again. I think that's the one area that it's eventually going to come to.

Senator CRAPO. Mr. Smith.

Mr. SMITH. Senator, I think fundamentally this is a policy decision, ultimately. It will be informed by the science, but ultimately this discussion will be made by the policymakers like yourself. The reason I say that is such a complex issue that we will argue the science until I am dead on this issue. It will continue to change. It will continue to go through the scientific process. That's the way science is.

I'm the son of an engineer. It's only taken me 40 years to get over that. My father was trained in science. He never gave a straight answer to anything. I love my dad. But the fact of the matter is that it's not because he's trying to avoid that or the science is trying to avoid the answer. The bottom line is the scientific process is one that isn't designed to give definitive answers. It's designed to refute rebuttable presumptions. I don't think we'll ever get a clear, absolute answer from the science on this issue.

I think that we do, however, have from the science some very, very clear trends, and like Dan said, there are areas where people generally agree that there are things we can do now to move forward. That's really our position. We believe that the science on dam breaching is very weak. It isn't strong. There is no compelling reason to breach dams. If you look at the science right now, there's no real benefit to fall chinook as far as the Snake is concerned. The benefit to spring chinook is very questionable depending on D values.

Well, they don't know whether there is really delayed mortality or not. Right now it doesn't look like it, but the science could change. So do we breach dams and hope that they recover—it recovers fish based on a very hypothetical process? I don't think so. But that's a policy decision. I believe that down the line, ultimately the decisions that will be made, they are being very highly—they're made much more complex by the Endangered Species Act, which will not give us as much flexibility.

But in the previous panel, Dr. Anderson made the suggestion that we look at the way we define ESUs differently. There is some flexibility, I think. Those are going to be policy decisions because NMFS has made a decision on ESUs they're probably not going to back off of, but if, for instance, we were to use some hatchery fish

as a refusion, as Jim suggested, that's probably going to be a policy decision. There's lots of areas, I think, where the policy aspects of this are going to come into play.

I ultimately believe that whether the policymakers in the region take an active role in this or default their active role, it still would be a policy decision. It won't ever be a science decision, ultimately will make a policy decision either by default or by actively setting out a recovery plan and going after it and saying this is the best we know how to do, and then through adaptive management principles, making it better as time goes by.

Senator CRAPO. Mr. Benson.

Mr. BENSON. As has been stated or alluded to, your challenge is certainly made more difficult by the fact—or by the—my observation that the science is never going to be overwhelming on one side or the other. You're always going to have to choose between some science, and not being a scientist, like we aren't, it really does become a matter of good policy.

I do believe that the sooner we begin spending money to do things for the fish, the better the fish are going to be and the sooner they are going to begin to show improvement.

Senator CRAPO. Mr. Corwin.

Mr. CORWIN. I have the disadvantage of being a lawyer and former Senate staffer, so I'm not biologically inclined. However, when I analyze these issues from a policy perspective, the ESA doesn't exist in a vacuum. There's other statutes that will demand that it become a policy decision in the end, one of which I reference in the Northwest Power Act, where we are worried about reliability.

But beyond that, I think that the other problem is you won't see reconciliation of the huge uncertainties in science anytime soon. I was actually at a PSU—Portland State University, had a whole symposium on this, how to make decisions on salmon in times of uncertainty, and I can provide some of the papers to you on that. They were excellent.

Senator CRAPO. That would be helpful.

Mr. CORWIN. That reminded me of—I saw a Presidential historian, Richard Norton Smith, speak a couple days ago. He said the trick to being a really good historian is to wake up every morning energized about dispassionately studying his subject. I think it's the same challenge here. We need to pin down the answers that we can and then move forward carefully and carefully monitor and evaluate everything—all of the steps that we take so that we're not here in the same spot 10 years from now.

Senator CRAPO. Thank you.

Well, certainly, I agree with the comments that have been made about the fact that ultimately this is a policy decision that will be made at some level and probably at multiple levels as our legal system operates.

I tend to believe that the more we study and the more science we are able to evaluate, the more we can build consensus on aspects of the science as we learn more and more about it, but I think the testimony we've heard today and in the other hearings shows that we are anywhere but near consensus on the science right now. In fact, I thought that we were getting to some consensus, and I'm

concerned now that maybe we're getting further away from some of the consensus that I thought we were starting to build.

One of the questions that I have and I realize now I'm starting to venture into the science arena. One question I'd like to have you discuss with me from your perspectives is this issue that I have used with both the other panels of the sort of competing science reports.

I have here the science report from the National Marine Fisheries Service that essentially says that taking out the dams is not going to save the salmon and that will not—I'll use their words,

> Even if mainstem survival were elevated to 100 percent, Snake River spring, summer chinook salmon would probably continue to decline toward extinction and modest reductions in the first year of mortality or estuarine mortality would reverse current population decline.

So here's a study saying that dam removal isn't going to do the job and focusing on, basically, the first year of life. The egg-to-smolt stage is where we can get the most bang for the buck. Here is a group of scientists responding saying that is not correct. That the fact that the highest levels of mortality occur in the first year of life is a natural fact of nature and that we haven't seen reductions in the survival rate in the first year since before the Snake River dams were put in. So you're not likely to do anything except spend a lot of time and money if you put your focus there. These are both current scientific reports, I think, within the last month.

We have different positions here represented on this panel with regard to what aspect of the salmon recovery should we focus on as we try to move forward. The question I have is on the science, as you understand it from your perspectives, is there any consensus about whether it is the egg-to-smolt stage or the smolt-to-adult stage that is where we should focus our priorities in terms of salmon recovery efforts? Maybe instead of asking you whether there's consensus, I'd ask you whether you believe it's one stage or the other that's the better stage to focus on, if you have an opinion.

Mr. James.

Mr. JAMES. Do I really have to go first?

Senator CRAPO. You can pass if you want.

Mr. JAMES. I would like to think about that for a minute.

Senator CRAPO. Mr. Barrie.

Mr. BARRIE. One thing that we can look at, I've heard a lot today about flow augmentation and velocities and such and that they didn't relate to, basically, adult return, and one thing that we can look at is this year's past salmon season on the Little Salmon River. I believe that those fish are in direct relation to the amount of water that we did have spilling in the high-water years from 1997, 1998—excuse me. That would be 1998, 1999. Those fish are a progeny of that return.

You know, to say that the velocity and such doesn't attribute to a better return, I wholeheartedly disagree with that. In evidence with the jack counts that have been mentioned earlier, next year's return looks to be great as well. Sure, we have had tidal changes in the ocean. Do I hope that continues? You bet. I would like to see the returns keep going up, up, up. I think this next year's jack count, based on the low-water year that we had for the—that that

return would show that it is going to be a key factor in knowing whether the ocean is making that cyclical return.

But to say is it the juvenile, from the smolt to adult or is it the egg-to-smolt, that's a tough one, and I think there's been a lot said about that just recently more so than in the past. I think that's becoming more and more a question. I think, like you're saying, there's going to need to be a lot more study, but I can't believe that throughout history from the dawn of time that these fish did not have that same percentage of egg-to-smolt survival rate. In common sense, it doesn't play.

Senator CRAPO. Thank you.

Mr. Smith.

Mr. SMITH. I don't really know or have an opinion on whether it's one or the other because I don't really know the science that well. But I do know this, that it makes more sense that—well, I read a recent letter from NMFS to one of the groups that had sent a letter to them. NMFS believes that, for instance, for every smolt that is saved in the estuary from predation, they get a tenfold increase in return. So they do have some data that shows that.

To me, there's some commonsense things that we can do without having to argue whether or not it's one or the other, but it does make sense to decrease predation in the estuary, I think we've already seen the results that this year where some significant decreases were made and there's a lot of room for improvement. Nobody really argues that, except we have lawsuits that stop us from moving birds that don't belong in a certain place. None of that makes sense to me. I think those are the areas that we all could get behind or at least a lot us could get behind.

I think that there's some really commonsense things. From a perspective of habitat, maybe it doesn't make a lot of sense in Idaho's tributaries to spend a lot of time on habitat unless this fertilization process can be productive because they're in good shape, but there are other places in the region, where they're not in good shape, and I think that's the problem with this BiOp. It's a one-size-fits-all kind of an approach. Flow is always good. Habitat improvement is always good. There's these general statements in there that don't apply to every single area in the region. There's very different conditions in each of these tributary systems.

So, habitat improvements may be tremendous in targeted areas. That's been our complaint for many years, is that we don't focus on things that are going to get us the biggest bang for our buck in a hurry, and that's why we think that stopping some of this predation, moving into habitat areas that are clearly degraded and need to be helped, going and doing some mainstem flow—not flow but passage improvements, and continuing to tweak that system makes a lot of sense. We think that that's the way to go rather than to—I can't tell you in all honesty whether or not one or the other is better, but to us there's a pragmatic way.

I think you said it best earlier when you said if the ocean is 90 percent and we're only playing on 10 percent and we've already gotten 90 percent of what we're going to get out of the hydrosystem, then we're talking about 10 percent of 10 percent as far as improvements on that, and we're going to spend hundreds of millions of dollars. Is there a place we could do it better? To me,

those are the kinds of things that go back to your policy question earlier.

We're probably going to need to make some policy decisions that say our best return on investment is in these five things. Let's go do them well and continue to study. I think we don't know much about the ocean, and we don't know about these questions you're asking. They should be studied, and if it's an issue, then we know how to address it.

Senator CRAPO. Thank you.

Mr. Benson.

Mr. BENSON. I'm certainly not qualified to reflect on egg-to-smolt versus adult-to-smolt, nor do we have staff scientists in our company that have done work in that regard. We have hoped, honestly, that science would be found that would support the position to leave the dams in place because of the importance they have in your operations. That has occurred. There is science now and, frankly, has been throughout the debate, and so I find myself a little perplexed by the ongoing debate. I would like for the debate to be over sooner than later.

But it seems to me that if there are credible scientists delivering credible science that says it's worth taking a shot at recovering these fish by leaving the infrastructure in place, that that would be a constructive way—or a constructive place to begin our work to achieve recovery of the fish.

Senator CRAPO. Thank you.

Mr. Corwin.

Mr. CORWIN. I would preface by saying the electrical co-ops are kind of in an interesting position because they go beyond carrying this—about the price of power in the dams. Their owners, customers are the landowners also. From that perspective, in this BiOp, we're trying to address eight other species, too, beyond the Snake system that we haven't discussed much where there very well may be habitat issues that haven't been discussed here today.

In the Oregon plan, for example, where they were dealing with species that weren't passing dams, there were very concerned about water temperatures and tributaries. I fundamentally don't accept the science, I guess, as a dichotomy. I don't think we've seen enough yet to make this call. I've looked at the statistical analysis in some of these papers. I haven't seen one where—you can think of 10 or 20 variables off the top of your head where they're all controlled, where they're all mixed between life stages and different combinations all up and down the river. I'm not sure we're there yet.

I think the more important point to come out of the one paper was if there's a serious finding that you can't get recovery even with 100 percent survival through the system, then regardless of how much you can get out of other areas, you better start looking.

Senator CRAPO. Mr. James, did you want to——

Mr. JAMES. I've now had a couple of minutes to collect my thoughts. It's a pretty complicated issue, clearly. Although, I'm not a scientist, I have a couple of observations. One is that it seems that we ought to be doing everything we can. I've heard it said anecdotally that it's all about getting adult spawners back, how do you know that you've achieved success, and that that's it. So we

ought to be looking at—based upon what we know, what gives you more adult spawners back.

I've heard references to something that Craig said about if you improve survival at key points, there at least is a theory that you get exponentially more fish back or by some factor anyway, and I think that that ought to tell us something in terms of where we ought to be focusing our efforts in the near term.

Another one, and I know that this is subject of disagreement, and that is the role of transportation. I think that there is some evidence that this smolt transportation—that barging fish has worked and that if we were to increase the amount of fish in barges, at least based upon the theory that we are getting more fish back that have a transfer system that way as opposed to going down through the dams, that we may be—you may see more adult spawners back. Again, it's a theory. People disagree, but as we've looked at the science over the course of the last 10 years or so, that's something that many of our members believe.

Senator CRAPO. Mr. Barrie.

Mr. BARRIE. If I can for just a second, that's one thing that I do want to address and that's the transportation issue of actual—the barging of the smolt. It has been done for a long time, and it has not worked. This year—I get the numbers every week as far as bypassed and smolt transportation. I've looked on them for numerous, numerous years. That plan is not working. I mean, we are still not getting the return that was projected by that idea. I don't want anybody to get the misconception that maybe we can start barging. We barged 96 percent of them the last 2 years. That's one issue that we definitely need to be aware of.

Senator CRAPO. Some of us have been advocating a spreaded risk for some time now.

Mr. BARRIE. There was an idea suggested today about every other year.

Senator CRAPO. What do you think of that as opposed to 50/50 each year?

Mr. BARRIE. It's a tough decision, and I think it might be one that we have to come down to. Some believe that that would be a good proposal.

Senator CRAPO. I see there's people getting interested in this discussion. Is there anything more that anybody wants to say? I think a debate started here.

Mr. SMITH. I don't mean to debate, but I think there's a couple things that I would like to add to the discussion, and that is, No. 1, I do think that it would be interesting to do every other year because it may give us some really valid statistics. The problem that I see with that is it's extremely risky.

I'm reading here from NMFS's documentation that,

> Overall direct survival of transported migrants is high, estimated at greater than 98 percent. Behavior and survival of transported fish below Bonneville Dam is similar to that of in-river migrants.

I won't read the rest of the paragraph.

The conclusion is while some differences in smolt-to-adult returns exist between transported and undetected in-river migrants, no significant differences have been observed. That, in a nutshell, lines out why it is that NMFS is not advocating breaching those

four dams, because without differences in in-river, undetected migrants and transported fish, the D value, there is no justification for breaching, and that's why they're backing away because their data right now does not indicate significant D value.

That could change. I'm not a scientist. I don't understand it, but that's from their own documentation that they put out. I do believe that the transportation program has been successful. Whether it's—it's not the long-term answer. I don't think anybody believes that, but at this point in time, it clearly is a good alternative.

Senator CRAPO. What about the question of delayed mortality? What if the other members of the panel said that's the $64,000 question.

Mr. SMITH. That is exactly what this addresses, the delayed mortality, basically, when you look at transported fish returns versus undetected in-river migrants. In other words, are the in-river migrants coming back at a higher rate percentagewise than the transported fish? That's the D value. That's the ratio.

Right now, there is no—that's what this document says. There is no significant difference in the computation. There is not enough difference to be significant enough to cause breaching to be successful. That's why the CRI analysis addresses that and does not believe that given the PIT tag data, and that's why we're in this discussion between PATH and CRI because CRIs use some of the latest PIT tag data, and I don't want to go into all that because I don't understand it all. But we can argue this forever, but I guess at some point in time, using the science as best as we know it, and it does change, then we have to make some management decisions.

Senator CRAPO. Mr. Barrie.

Mr. BARRIE. One thing there, though, that you need to understand is that when 96 percent of fish are barged, you've got 4 percent competing against 96 percent to have the same amount back.

Mr. SMITH. No. That's not the way it works. It's a ratio, and so what they do is they count the number of fish down and then the number of fish back out of that same number, and it's a ratio of smolt-to-adult returners, so it's not a direct number.

Senator CRAPO. Although, if you do have 96 percent in one category and 4 in the other, it's——

Mr. BARRIE. The ratio is swayed.

Senator CRAPO. The question is whether that 4 percent is enough to give you a valid test.

Mr. SMITH. I understand that.

Senator CRAPO. I see the points that you're making. A question that I have—I thought I saw another hand or somebody else wanting to jump in.

One of questions that I have—and, Mr. Corwin, in your testimony, you stated that the hydrosystem will continue to be a major focus of recovery in the BiOp and very significant effort will continue to be made there. I assume that—and, Mr. Benson, you said that you agree. I'm putting words in your mouth, but I think I'm correct here. You can correct me if I'm wrong. Would you agree with the premise of the BiOp, namely that we put back the breach decision and see if we can find nonbreach alternatives that will work in the meantime?

The question that I have is this: If we accept that premise—and I think whether we accept it or not, that's probably what we're going to live with what NMFS is doing—then we do have a period of time in which the decision to breach has been set back, and we have, hopefully, a choice or an ability to influence the choice about what we do during that period of time.

Over the years, as I've read scientific studies and evaluated all of the science that has come my direction, it has seemed to me that a tremendous amount of the focus has been on the hydrosystem as a cause of human-caused mortality to the fish and that if we take our attention away from the hydrosystem as we focus on what to do during the next 5 years and focus in other areas that don't give us as much return—in other words, if we don't get this right, then we could be in a situation where we, as one of the witnesses, I think, Mr. Thurow, said earlier, "You're not going to recover the fish with the current BiOp. It is not going to happen". That's what he said, if they focus in the way that it appears they're going to focus.

Wouldn't it be better to do everything we can on the hydrosystem short of breaching so that when these 5 years have passed, we at least know in that area of it that we have done our best? At the same time, we could, as I think Mr. Smith has suggested, in areas where the habitat needs improvement, we could do everything we can there, and in areas where we find improvement opportunities in the estuaries, we can do what we can there. But is there any justification for abandoning a focus on doing the very best we can do with improving the hydrosystem?

Mr. CORWIN. I would say, no. But I guess I'm—I haven't been able to detect where this BiOp and recovery strategy does that. What it does is build on the existing efforts in the hydrosystem. Certainly, monetarily it does that, but I think it does that by keeping what's in place, by doing further experimentation on some of the major aspects of what we're doing in the hydrosystem, such as testing the spill programs. They're certainly trying to continue to restructure the dams themselves with surface bypass systems, all big efforts still underway and continuing and building and even the efforts, as I said, outside of the hydrosystem, you know, many of which will be paid for by the hydrosystems. The focus is still very much there.

The question—the quandary will be in is if we don't accurately measure and account for these another areas that we're starting to look at. When we look at the performance measurements, that's where we do have a concern. I don't think that they're at a point where they have been able to figure out how are you going to determine exactly what returns you're getting from habitat and from hatchery actions. That's going to be critical if you are going to continue this road.

Senator CRAPO. Did anybody on the panel—I understand, Mr. Barrie, that you believe that—if I understand your position correctly, that we should consider breach now, not put if off, so you're not necessarily willing to agree with the premise of NMFS BiOp?

Mr. BARRIE. I believe right now the way it reads is it's a status quo. It's the same thing we've been doing for 20 years. There's no

change. I do agree with Scott in saying that we're not getting anywhere.

Senator CRAPO. But with that exception, with the understanding of your position, is there any other disagreement on this panel with the notion that given the NMFS's approach, that we ought to do everything that we can do on the hydrosystem as well as in the other areas? I want the record to reflect that nobody is disagreeing with that.

Mr. JAMES. The additional thing that I would say and one of the things that I think is key here is performance measures. We need to be able to figure out if we're spending money the right way, whether it's the hydrosystem or something else.

Senator CRAPO. That's a criticism that I think I've heard pretty regularly about the current BiOp is that its performance measures are too general and diffuse and not focused on helping us identify these questions that we need answers to.

Having established that we don't have any disagreement with regard to trying to do our best in each of the areas including the hydrosystem, and, Mr. Corwin, you indicated that you couldn't see in the BiOp a difference from that, that you think that that's where the BiOp is headed now. I'll tell you that Mr. Will Stelle, the former director or whatever his title is of NMFS here in the region, said the same thing in September in Washington, DC, when I asked him similar questions. He said,

> We are not moving our focus away from the hydrosystem. We're still going to do everything we can there. But we're not moving toward breach. We're not going to do breach now.

The concern, though, is that when you have a—I've had a number of other scientists in communication with my office indicate that they do believe what they read in the BiOp is a distinct change in focus of priority, away from the hydrosystem. When you read the science study that the three NMFS scientists put out, which basically says you can improve the hydrosystem to 100 percent survival and it isn't going to work, and add that to arguments that have been made that they pretty much got all the benefit they're going to get out of the hydro improvements, then you at least see a concern being raised that perhaps NMFS truly is changing its priorities and is not going to try to get the maximum benefit that it can in hydrosystem improvements.

I just wanted to be sure that—we can argue about what is the maximum we can get and how we achieve it and all that, but whether we should get the maximum that we can short of breaching is something that I think we ought to be sure we agree on.

Another question that I think is important to address is how we will address—how we will deal with what I perceive to be a significant lack of collaborative effort on behalf of the Federal agencies. I don't know how many of you have been involved in trying to collaborate with the Federal Caucus, but as you have tried and if you've been more successful than I have, then—which means you've had any success I would like to know how you've done it. What is your perspective on your ability to communicate with and have your positions and viewpoints understood and evaluated by the Federal Caucus? Again, if you choose to answer, you can. If you don't, not everybody has to.

Mr. Corwin.

Mr. CORWIN. I've tried very little to collaborate with them. However, I would say there are a couple of consultants for the hydro industry that have attended workshops that the NMFS Science Center has held to update folks in the region on what they have been up to and on their new research over the last year or so, and they have had—they have given us favorable reviews about ability to work with the folks at NMFS in Seattle but on general collaboration.

Senator CRAPO. That's refreshing to hear even to that level.

Anybody else?

[No response.]

Senator CRAPO. One last comment, and then, again, any of you who would like to comment on this—respond to this, you're welcome to, and you're not expected to.

One of the concerns that I've had, something we started out this hearing with, and that is that there's recently a document that The Oregonian was able to obtain, apparently, from NMFS, which indicates that NMFS was headed down a path toward recommending breach and actually having the engineering and everything else in place to bring it to Congress by the end of the year 2002 or 2003. That in a very short period of time, that changed, and NMFS is now going down the direction we've discussed today.

A concern that has been raised to me and which I share is that if NMFS truly has decided that it believes that breaching the dams is the direction it must take, and if this BiOp is simply a strategy to get there, then that raises a lot of concern about what NMFS is going to do in the meantime. I realize that's a rather cynical evaluation of what may be going on here. But given the virtually closed system of decisionmaking we've seen in the last 2 years from the Federal Caucus, given the information about where we saw the Federal Caucus headed and their almost immediate about-face in the middle of a Presidential election in which Washington and Oregon were critical electoral votes, I don't think it's an unfair question to speculate about in terms of what is the motivation of the National Marine Fisheries Service in the actions it has taken.

I think it will be very interesting to see what kind of response they give to my earlier request in this hearing for them to document what they have received from the Council on Environmental Quality and the White House over the last year in terms of directives. If their response is like it has been in the past, well, we'll see.

In any event, the question that I pose to each of you is, if we pursue a path during the next 4 to 5 years that doesn't give us the very best ability to save the fish short of breaching the dams, do you not feel that we will be in a position as a region where breaching the dams at that point becomes the only remaining option to evaluate?

In other words, do you feel that if we're here 5 years from now and we have witnesses in a panel like this who say, you know, you started something 5 years ago that you knew wasn't going to work or that we could tell you it wasn't going to work and it didn't work, or you're now facing a situation where you have a Federal agency that is pursuing a breach alternative, are we, as a region, going to

be in a position where we knew we gave it our best if we don't right now evaluate what our best options are?

Again, nobody has to comment on any or all of that, if they don't want to, but you're certainly welcome to speculate, if you would like.

Mr. Smith.

Mr. SMITH. I'd like to say this: I think that ultimately NMFS can't make this decision, and I think that's why we're struggling so badly right now. They have been put in a position—I've never been a big Will Stelle fan, but Will was in an absolute no-win situation as regional director.

Senator CRAPO. That much I agree with.

Mr. SMITH. The agency itself is in a no-win situation, and they argue amongst themselves, and when you talk about the Federal Caucus, we've had good luck with parts of the Federal Caucus, but it depends on which part you're talking to on which day.

I think the real solution here is for the region to come together and make some decisions. That's why we're so supportive of the process the four regional Governors have tried to put in place, and we'd like to see it get legs because we believe that once we can get a regional recovery plan in place that it not only takes the focus off of the decisions that NMFS makes, which they shouldn't be making, it also gives us a forum in which to discuss these policy issues that a Federal agency cannot do. They cannot make policy decisions. They have to try to rely on the science because that's their mandate.

Since you can't decide this issue based on science alone, I don't see how we will ever be successful until we find a different way to approach the issue. That's why we think it's fundamental that the region pull together and take our own future in our own hands, and that's not going to be an easy thing to do, but I believe that it's the only possible solution.

Senator CRAPO. Anybody else want to take a stab?

Mr. CORWIN. I'm glad Craig mentioned the Governors' approach because I think that's critical. They said a regional approach must include a clear goal so that, in short, the region can understand what constitutes success. If we continue with the policy conflicts and regional disagreement over things like trying to manage the two types of fish simultaneously, if we don't take actions in other areas, we can put our best foot forward, and I think we should in the hydro area, and still be down the line several years from now with folks screaming back at hydro because actions haven't been taken in other arenas that are critical to this issue.

Senator CRAPO. Mr. Barrie.

Mr. BARRIE. I've read about that plan that supposedly just showed up, and I'm going to be honest with you. I think it is a good plan. If you have something in place that by 2006 your goals are not reached, it gives you the measure to go in that direction. Guys, we're talking about a plan we're supposed to have in place by that time, measured points at which we are achieving our goals. If we're not achieving our goals, in fact, we're going the other direction away, then the hard decision has to be made, and it is put in place for that.

Senator CRAPO. We'll have much more region consensus at that point, I believe, if the region believes that they've been trying the right things.

Mr. BARRIE. We keep talking about measurements. Well, I believe that from this day forward, we've got to take from status quo where we're at, and if we're making these improvements whether it be the habitat, you name it, and we're not attaining those goals, then I believe that's what's got to be done. Like I said, we have no agenda for dam removal. What we have is an agenda to get the fish back, whatever it takes.

Senator CRAPO. Anybody else?

Mr. James.

Mr. JAMES. I return to a point that I made earlier, and that's fights that we'll have about getting ready for dam breaching will diminish our ability to get other things done, I believe. It's sort of splitting hairs or we're going to do—we'll partially fund studies for dam removal, and we'll partially fund those things that we can do that are good for fish in the near term. I think that hardwiring a decision, to use some of the phrases that we've seen there, almost provide a disincentive to get those things done for fish that can be done in the near term because I think that there are other factors that play here.

I think we all recognize the role of the Snake River in this national debate about rivers and that this is a—well, many of us are focused on salmon. There is a larger debate nationwide on rivers, and that we are at the center of that debate. So in a way, it almost provides a disincentive to solve the problem. We've seen many people on both sides of the debate over how to best recover Snake River salmon acknowledge that point.

Senator CRAPO. Mr. Benson.

Mr. BENSON. I would just submit that if we're doing the things that we should be doing in the next 1, 2, 3, 4 years, that at 5 years to take a different tact is quite shortsighted, and I would hope that we would not look at this as a 5-year—and I'm not even sure an 8-year horizon gives time to see the results of the things that we would attempt to put in place between now and that time.

Senator CRAPO. All right. Thank you. I have no further questions for this panel. Do any of you have any last words you want to get in? I'll give you a chance to make a last statement, if you'd like to. If not, this panel is excused, and I will make a closing statement here and then wrap up the hearing.

In my closing statement, I'm going to be—I'm going to continue to be quite critical of the National Marine Fisheries Service in the way it's handled the decisionmaking on this BiOp. Before I do make that statement, however, I want to say that, as has been said by some of the witnesses here today, as has been said by NMFS at the hearing in September, they don't agree with what I think they're up to. They don't agree with the concerns that I have raised about whether they are shifting their emphasis away from the proper focus on what we can do best to restore and strengthen the salmon and steelhead runs. If that's right, then so be it. We have no problem.

If that's wrong, then they need to change the direction that they're headed. I'm concerned that there does need to be a change

in the direction that NMFS is headed both in terms of the process that they are following to make this decision and in terms of the content of the decision that it appears they are about to make.

I would, first of all, like to thank everybody here who has testified for attending, those who have reported and otherwise endured today's hearing. I'm struck by the fact that after 3 days of hearing by this committee on this matter, that, while we don't know everything about how to recover anadromous fish, we do, nevertheless, have an enormous amount of good information. What remains a mystery to me is why we cannot assemble this information in a way that assures the best possible outcome.

I am extremely concerned that the Federal agencies are not doing everything possible to organize people and their knowledge in a systematic effort to get this right. I again quote the November 3rd issue of the Columbia Basin Bulletin. Ben Daley of the BPA said,

> Whether the States and tribes participate doesn't change the Federal obligation to make measured progress toward meeting these goals. We have the responsibility to figure out how to involve others, but we're not there yet. We'll be stumbling around on this first one and probably be somewhat out of sync with the region planning.

It looks to me like Mr. Daley has it right. I want to emphasize that my reference to Mr. Daley's quote is in no way a criticism of him because he simply seems to be telling the truth.

It's anticipated that once this draft BiOp becomes final, it will immediately be subjected to one or more lawsuits, which raises the distinct possibility the courts may be forced to take over anadromous fish recovery in the region. I'm sure that the courts would prefer not to have to do that, and I certainly don't want the courts in that position.

By far the best choice is for the region itself to grasp the issue and in a collaboration with the Federal Government make our best effort. As I've said before, I believe the four Governors' document, which has been mentioned by a number of the witnesses today, outlines a far better process than anybody we've yet seen by the Federal Caucus. The Governors' approach supported by a short-term focused effort of rigorous scientific collaboration would provide far more benefit to the fish and the regional economy than this Draft Biological Opinion.

As I say, unless I'm wrong about the direction that it appears to me that NMFS is headed, the ultimate outcome could very possibly be worse for the fish, worse for the jobs and the economy of the people in this region, and ultimately much more expensive as it causes this region to face difficult decisions that it otherwise would not have had to face.

It's painfully obvious to me that the Federal Caucus itself is divided about what is the best science and the best policy. It's well established that there is widespread disagreement around the region with this Draft Biological Opinion. Those who are generally supportive of this draft offer important criticisms. Even though we have not mastered the process required to recover these fish, it is very obvious that we do have an enormous amount of good information. In fact, we have enough information right now that we should be able to develop a much better policy than is currently being pro-

posed, a policy that takes immediate action, that is known to benefit the fish while providing an agreed upon mechanism for monitoring any subsequent adjustments.

With everything that is at stake, let me publicly suggest that the Federal Caucus delay its printing and publication of the final BiOp for a short period of time, perhaps 2 to 6 months, in an effort to assure us all that we are making our maximum possible effort. I'm asking every Federal witness to carry that request back to their management, and I will followup this verbal request with a letter immediately. It seems to me, once again, that we have an opportunity to get it right and that we need to make sure that we take that opportunity.

I would like to thank everybody for attending this hearing today, and the hearing is adjourned.

[Whereupon, at 2:15 p.m., the subcommittee was adjourned, to reconvene at the call of the chair.]

[Additional statements submitted for the record follow:]

STATEMENT OF MICHAEL SCHIEWE, DIRECTOR, NORTHWEST FISHERIES SCIENCE CENTER, FISH ECOLOGY DIVISION, NATIONAL MARINE FISHERIES SERVICE, SEATTLE, WA

Thank you, Mr. Chairman and members of subcommittee. I'm Michael Schiewe, Director of Salmon Research at the National Marine Fisheries Service's Northwest Fisheries Science Center in Seattle, Washington. Within the National Marine Fisheries Service, the science centers are responsible for providing the technical and scientific support to the regional offices in carrying out their regulatory and management responsibilities. I appreciate the opportunity to be here today. I will limit my formal comments to those involving the biological opinion and the collaboration in the scientific process.

First, to summarize from the testimony of Mr. Stelle to this subcommittee on September 13, 2000, the National Marine Fisheries Service is currently engaged in the preparation of two major documents. One is a biological opinion for the Federal Columbia River Power System. The other is a conceptual recovery plan being called the All-H Paper. This latter exercise is being led by NMFS but is more broadly the product of the Federal Caucus composed of NMFS, the U.S. Army Corps of Engineers, the Bonneville Power Administration, the Bureau of Reclamation, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, the Bureau of Indian Affairs, the U.S. Forest Service, and the Bureau of Land Management.

In preparing these documents, NMFS considered the results of a variety of analytical exercises and scientific syntheses including results from the Plan for Analyzing and Testing Hypotheses, or PATH; NMFS' Cumulative Risk Initiative, or CRI; and the empirical information summarized in NMFS White Papers. Following review and comment by the State agencies and tribes, both the biological opinion and the All-H Paper are currently scheduled for release in final form on December 15.

On the issue of science collaboration, a major opportunity will occur via participation in technical recovery teams. We have already formed technical recovery teams, or TRTs, to start the process for recovery planning in Puget Sound and on the Lower Columbia River and Willamette Valley, and we are considering establishing TRTs to develop recovery plans for the listed salmon and steelhead in the interior Columbia River Basin.

The process NMFS has initiated to develop these plans is a two-phase one with the involvement of both regional technical and policy expertise in each of the relevant phases. To briefly summarize, the first phase is a scientific exercise culminating in the establishment of delisting criteria or recovery goals.

The second phase is more of a policy forum in which the options for recovery will be carefully weighed and a suite of actions selected. Both the technical phase and policy phase will involve qualified individuals from regional entities and interest groups. A recovery science review panel composed of internationally renowned ecologists and evolutionary biologists will review the products of the TRTs. Our goal is to bring together a broadly representative group of the best minds to tackle these issues.

To summarize, it is NMFS's intent that the recovery planning process will take place out in the open, that it will meaningfully involve regional scientific expertise,

that the recovery plans will be subject to peer review, and that the final technical products, when appropriate, will be published in scientific journals.

Thank you for this opportunity to address the subcommittee. I would be pleased to answer any of your questions.

STATEMENT OF DOUG ARNDT, CHIEF, FISH MANAGEMENT DIVISION, U.S. ARMY CORPS OF ENGINEERS, NORTHWESTERN DIVISION, NORTH PACIFIC REGION, PORTLAND, OR

Mr. Chairman, I am Doug Arndt, Chief of the Fish Management Office in the Northwestern Division, U.S. Army Corps of Engineers. I appreciate the opportunity to be here today to discuss the status of the National Marine Fisheries Service and Fish and Wildlife Service's biological opinions on operation of the Federal Columbia River Power System.

As you noted, on September 13, you heard the testimony of Colonel Eric Morgren on behalf of the Corps. Today I'm going to very briefly summarize that testimony, plus I'll add several topical points. Currently, 12 populations of Columbia River Basin salmon and steelhead, white sturgeon, and bull trout are listed under the Endangered Species Act. That means that we must broaden our consideration of recovery solutions from the lower Snake River to the entire life cycle of the salmon throughout the basins if we are to be successful.

On the flip side, this year we saw strong returns of adult salmon to the Columbia. We believe these results are at least partially due to the investment that the Nation has made in the hydropower system.

Consultations on the 2000 biological opinions are ongoing. While we anticipate—we do anticipate receiving a final BiOp or BiOps on or about the 15th of December. While there are still some measures that need further work, we are optimistic at this point that we would reach agreement on the major issues and on the overall directions. We are satisfied that the draft biological opinion is reflecting an increasing intent to pursue aggressive actions across all the Hs with specified performance standards and periodic check-ins.

Earlier in your opening statement you emphasized the need for good science. We are also pleased at the current regional effort to base recovery actions on the best available science. The course part in this effort is to fund some 50 to 70 field research studies under our anadromous fish evaluation program. That, by the way, is a collaborative process involving the State, Federal, and tribal entities. We see this investment of some 10 to $20 million in field research in seeking out better scientific knowledge as being vitally necessary for making the reasoned management decisions that you alluded to.

On the issue of funding, full implementation of the measures called for in the biological opinions will be ambitious. It will require substantial increases in our appropriations. For example, the President's fiscal year 2001 budget submitted to Congress this year called for $91 million in the fish—the Corps' fish mitigation project. Our fiscal year appropriation, as passed by Congress, was $81 million. We estimate that some additional $5 million to $10 million may be needed to fully implement the measures in the biological opinions. Further, we anticipate the cost will increase in the out years. This is an important issue as our biological opinion report card will heavily depend on our ability to implement, read that as fund, recovering measures.

One of the areas of the biological opinion is to call upon the Corps of Engineers to carry out actions in the offsite or habitat measures for fish restoration as a means of supplementing hydro actions. For example, we are being asked to step up our efforts in the restoration in the Columbia River estuary. We believe this is important and should be a part of our approach to the fish recovery.

We look to the Congress for continued support of these efforts. We will continue to work with you and to keep the lines of communication open.

Mr. Chairman, this concludes my summary, and I will be happy to answer any of your questions.

STATEMENT OF HOWARD SCHALLER, PROJECT LEADER, COLUMBIA RIVER FISHERIES PROGRAM, U.S. FISH AND WILDLIFE SERVICE, VANCOUVER, WA

Good morning, Mr. Chairman. I'm Howard Schaller from the Columbia River Program Fisheries Office of the U.S. Fish and Wildlife Service and I appreciate this opportunity to present testimony on behalf of the service regarding status of the biological opinions for the Federal Hydropower System of the Columbia.

Our office is primarily responsible for a recovery evaluation of Columbia River aquatic resources, which include sturgeon, bull trout, and salmon. The service is

conducting a consultation on the operation of federally-owned hydropower facilities on the Columbia, Snake, Clearwater, Kootenai rivers in the Columbia River Basin. We're consulting with the action agencies of the Army Corps of Engineers, Bonneville Power Administration and Bureau of Reclamation. At issue are the effects of operating the Federal Hydropower System on the Endangered Kootenai River sturgeon, threatened bull trout, and to some limited degree, bald eagles.

The service received two biological assessments from the agencies, a draft document in the summer of 1999, and a final in December 1999. We shared a preliminary draft of the opinion with these agencies in May 2000, and the comments on the preliminary draft opinion were received June 2000. The draft opinion was released to the States and tribes for comment on July 27, 2000.

Throughout this process the emphasis has been placed on the discussion of key issues including minimization of adverse effects to sturgeon and bull trout from the PS operations in the Upper Columbia River. Our draft opinion requests adjustments to the operations and ramping rates at Hungry Horse, Libby, and Albany Falls dams. We're also asking the Army Corps of Engineers to continue studies of alternative pool elevations Albany Falls to benefit kokanee salmon, a key food source for bull trout in Lake Pend Oreille.

The draft opinion also addresses actions at Libby Dam to allow increase flows to chief flow objectives for sturgeon. For the Lower Columbia River, Snake River, and Clearwater River, the service will require monitoring to better determine the presence of bull trout and ensure their upstream and downstream passage is not impeded. The services work closely with National Marine Fisheries Service throughout this process to ensure that the Federal Hydro System operations benefit sturgeon, bull trout, and do not conflict with salmon and steelhead.

We are presently revising the biological opinion based on comments we received from the States, tribes, and other affected entities. We are now completing the opinion and accompanying documents and anticipate to have a final draft out by mid-December.

Mr. Chairman, this concludes my testimony, and I'll be happy to answer any of your questions that you and the members have. Thanks. This is a summary of Mr. Cottingham's comments from September.

STATEMENT OF JAMES J. ANDERSON, ASSOCIATE PROFESSOR, SCHOOL OF AQUATIC AND FISHERY SCIENCES, UNIVERSITY OF WASHINGTON, SEATTLE, WA

This testimony concerns the 2000 Draft Biological Opinions by the National Marine Fisheries Service and U.S. Fish and Wildlife Service on the operation of the Federal Columbia River Power System and the Federal Caucus Draft Basinwide Salmon Recovery Strategy. This testimony considers actions to be taken in the next 5 to 8 years to help fish recovery.

My name is James J. Anderson; I am an Associate Professor in the School of Aquatic and Fishery Sciences at the University of Washington, and I have been fully engaged in Columbia River salmon research for two decades. Mr. Chairmen, I thank you and the committee for this opportunity to testify in this hearing on the Draft Biological Opinion. In my testimony, I first put the salmon decline in a historical context and consider the future in which the region will use Bi-Op results. I then discuss the adequacy of several Bi-Op approaches.

The decline of salmon: We know that the decline of Columbia River salmon involved the interplay of climate/ocean fluctuations and the cumulative impact of human activities on salmon and their habitat (Anderson 2000a). Significant natural variations have occurred on decadal scales and these are loosely viewed as switches between two distinct climate regimes that may persist for two to three decades. The 20th century began in a cool wet regime favorable to salmon. It switched to a warm dry regime unfavorable to salmon about 1920. The climate returned to the cool wet regime during the development of the hydrosystem and then switched back to a warm regime over the past 20 years. It is important to note that the impacts of the hydrosystem development were partially masked by the good conditions of the wet regime and the recovery efforts of the past two decades were partially masked by the poor conditions of the dry regime. Recently the ocean has cooled and fish runs have improved. (Anderson 2000b). It is unknown if this represents a switch to a cool regime or a short-term anomaly in the pattern of global warming.

If we have entered a favorable climate regime, then at the end of this decade fish runs could be abundant, independent of any restorative actions taken through the Bi-Op. More importantly, under this scenario the climate will eventually switch to the unfavorable regime perhaps in the second or third decade of the century. In the second scenario, global warming dominates the decadal cycles and the ocean contin-

ually warms. In both scenarios, conditions for salmon will degrade sometime in the future due to warm dry conditions. It is also inevitable that the competing demands for water and fish habitat will in the future be greater than they are today. Will the Bi-Op plan provide the information needed in a drier future with greater demands for the Columbia River's resources?

Can the Bi-Op evaluate recovery actions? The 2000 Biological Opinion sets the course for research and actions to be taken over this decade to recover endangered salmon. Two important milestones are identified. In 5 years (2005), if the trend in the stocks has not significantly improved the program will be reopened for adjustments including dam-breaching. At year 8 (2008), if the stock trend is downward the agencies will seek authority to breach the dams if the current science supports that recommendation.

This is not sufficient time to evaluate actions. The time between when the adults spawn and when the fisheries agencies have complete information on the returns of the progeny is 6 years. This means that for decisions at year 5, complete information will be available only for fish that spawned this year and for year 8 only information from spawners over the next few years will be available. Furthermore, 10 to 20 years of returns are required to separate the effects of actions from the effects of climate variability (Peters and Marmorek 2000). Therefore, under the Bi-Op schedule, the decisions on the effectiveness of actions will depend on the State of the ocean over the next few years and will be essentially independent of the Bi-Op actions.

Can the Bi-Op measure the effectiveness of physical standards? Many Bi-Op actions are based on physical standards that produce desired changes in ecological attributes important for salmon, e.g., water flow, sediment load and temperature. Although the standards are referred to as interim surrogates of performance, the Bi-Op does not specify how they will be connected to fish survival. It neither characterizes the potential range of the measures in terms of survival nor addresses if the desired changes are ineffective or even detrimental to fish.

Can the Bi-Op assess the effectiveness of dam breaching? The majority opinion within PATH claimed dam breaching was the most effective recovery action available (Marmorek et al. 1998). The NMFS Cumulative Risk Initiative (Kareiva et al. 2000), armed with new information, sided with the minority opinion in PATH and concluded that dam beaching on its own would not recover the stocks. CRI is vague as to what will recover the stocks but points to the estuary and the freshwater habitats as critical. If dam removal is a solution though, it requires a complex link between the smelts' hydrosystem experience and their survival in the estuary. Evaluating this linkage may be difficult or impossible in the timeframe for decisions.

Does the Bi-Op assess the value of flow? The Bi-Op has an aggressive policy to increase flows in the rivers, claiming they will benefit fish through many life stages. The NMFS research has shown flow is insignificant to fish survival, or at best its benefits uncertain. Furthermore, flow augmentation is different from the seasonal and year-to-year variations in flow, and it has even less impact on survival. Under some situations, flow augmentation can be detrimental to fish (Anderson et al. 2000). The Bi-Op has no program to evaluate the actual impact of flow, where it is effective and where not. In some cases, there is sufficient information to establish a possible range of flow augmentation impacts but decades of observations may be required to identify mechanisms and narrow the uncertainty in the estimates. The Bi-Op virtually ignores the need for these studies. The reliance on physical standards is inadequate to effectively manage flow in the future when water resources will be in more demand than they are today.

Does the Bi-Op treat hatchery fish adequately? A significant number of wild spawning stocks have hatchery influence but the Bi-Op does not treat these influences in a consistent manner. For example, a high proportion of Snake River fall chinook spawners are thought to be hatchery strays, but it is still considered part of the ESU. In contrast, to keep Carson Creek hatchery fish from mixing with wild fish, they are clubbed as they attempt to spawn in streams. This is a considerable public relations problem because the Carson Creek strain is very successful and returns in large numbers. Hatchery fish are also significant because the assessment of wild stock productivity for decisions in years 5 and 8 depends on the fraction and success of hatchery fish spawning with the wild stocks. The decision to breach dams could rely on what we assume for the success of the hatchery fish. It is somewhat ironic, if the hatchery fish are successful river spawners, the Bi-Op could call for dam breaching.

The Bi-Op calls for hatchery reform to eliminate or minimize the harm to wild fish and on an interim basis to supplement the wild fish with genetically similar hatchery fish to avoid extinction. Even though hatchery fish are inextricably linked with wild fish, the recovery measures focus only on naturally spawning salmon. If

hatcheries represent successful ESUs then they should be considered when assessing the status of the ESUs. Perhaps instead of treating hatcheries as interim measures, they should be considered as genetic reservoirs, especially during periods of poor ocean conditions. At the beginning of the last century, hatchery fish were considered a solution to the problem. At the end of the last century, they were considered part of the problem. How will hatcheries be viewed in this new century? The Bi-Op needs to address these issues.

Are Stakeholders represented? There are many opinions on the causes for the decline of the salmon and how they can be recovered. The Bi-Op represents the Federal Caucus proposal for achieving a comprehensive, long-term strategic direction for actions in the basin. It solicits stakeholder contributions through consultation and corroboration refinements of the proposal, but there is no formal process for comments or for presenting alternative approaches. It is a difficult task. PATH had this goal, incorporating State, Federal and tribal scientists in a formal decision framework. Unfortunately, many conclusions of PATH were discounted because of public perceptions of bias, undue complexity, and because new studies disproved critical assumptions used in PATH. The relatively open but cumbersome PATH has been replaced by the closed and streamlined Federal Caucus process. In PATH, a steering committee set the direction of the research; the participants carried out the work and the results were synthesized by ESSA, the company hired to coordinate the workshops. In preparation of the Bi-Op, the overall framework and substantive issues were developed within the Federal Caucus. Community input came in the way of occasional workshops and written comments. The inputs that were incorporated related mostly to issues of model parameters and correcting obvious mistakes in the Bi-Op modeling framework. From my observations there is no mechanism to input substantive issues to the Bi-Op process.

REFERENCES

Anderson, J.J. 2000a. Decadal climate cycles and declining Columbia River salmon. In Proceedings of the Sustainable Fisheries Conference, Victoria, B.C, ed. E. Knudsen. American Fisheries Society Special Publication No 2x. Bethesda, MD. 467–484.

Anderson, J.J. 2000b. Testimony before the Subcommittee on Water and Power of the Senate Energy and Natural Resources Committee held in Cascade Locks, Oregon April 18, 2000. (www.cbr.washington.edu/papers/jim/testimonies/senate—water—2000.html).

Anderson, J.J., R.A. Hinrichsen and C. Van Holmes. 2000. Effects of Flow Augmentation on Snake River Fall Chinook. In comments by Idaho Water users on the "Draft All-H paper by the Federal Caucus: Conservation of Columbia Basin Fish Building a Conceptual Recovery Plan." Submitted on behalf of the Committee of Nine and The Idaho Water Users Association March 16, 2000.

DRAFT Biological Opinion 2000: Operation of the Federal Columbia River Power System Including the Juvenile Fish Transportation Program and the Bureau of Reclamation's 31 Projects, Including the Entire Columbia Basin Project. (http://www.nwr.noaa.gov/1hydrop/hydroweb/docs/2000/2000Biop.htm)

Kareiva, P.M. Marvier and M. McClure. 2000. Recovery and management options for spring/summer chinook salmon in the Columbia River Basin. Science 290(3): 977–979.

Marmorek, D.R., C.N. Peters and I. Parnell (eds.) 1998. PATH final report for fiscal year 1998. Prepared by ESSA Technologies Ltd., Vancouver, BC, 263 pp.

Peters, C.N. and D.R. Marmorek (compls./eds.) 2000. PATH: Preliminary Evaluation of the Imparting Opportunities and Biological Consequences of Monitoring and Experimental Management Actions. Prepared by ESSA Technologies Ltd., Vancouver, BC, 150 pp.

STATEMENT OF CHARLES M. PAULSEN, PRESIDENT, PAULSON ENVIRONMENT RESEARCH, LAKE OSWEGO, OR

Thank you for this opportunity to testify before the subcommittee. In preparing my written testimony, I have tried to make my remarks accessible to a non-technical audience, and to keep the tone fairly informal. I include an annotated list of technical references at the end of the paper.

I have approximately 14–15 years of experience doing research on Columbia River salmon. The first half of that period was devoted primarily to socio-economic aspects of salmon enhancement and recovery actions. The last 6–7 years of work has focused on quantitative analysis of the biological effects of measures to aid Endangered Species Act (ESA) listed stocks. These efforts have been funded largely by the Bonne-

ville Power Administration (BPA), and to a lesser degree by the Corps of Engineers. However, the views expressed here are strictly my own, and should not be interpreted as representing those of BPA or any other organization.

My remarks focus on three broad areas:

1. The Cumulative Risk Initiative (CRI) life-cycle analysis that forms the basis for the population status analysis in the NMFS September 2000 Draft Biological Opinion (Bi-Op);

2. The Plan for Analyzing and Testing Hypotheses (PATH) results, how they compare to recent data, and how they are used in Bi-Op;

3. Uncertainty in the biological effects of the Bi-Op "Reasonable and Prudent Alternatives" (RPA's) and in the possible effects of drawdown.

Obviously, this covers a lot of territory, and my comments will only touch on the highlights of each topic.

CRI LIFE-CYCLE APPROACH

At the risk of over-simplifying a complex modeling exercise, one can characterize the CRI approach as assuming that the future will be a straight-line projection of the past, with a great deal of random noise around that projection. It uses estimates of salmon population abundance over time—generally derived from dam counts or redd (nest) counts of fish returning to spawn—and extrapolates trends in past estimates into the future. Unlike PATH efforts, each population is assumed to be independent of the others, except in sensitivity analyses (the latter are not used in the Bi-Op itself). Because salmon abundance varies greatly from year to year, the CRI approach, in common with other attempts to predict future fish numbers, is not very precise. While the "average" trend for a population may be upward or downward, one cannot place very much confidence in any particular value of the trend estimate. However, it is clear that populations of most ESA-listed stocks have shown marked declines over time, regardless of the model used to project those trends into the future. The downward trend, after all, is the rationale behind listing the stocks under the ESA.

As others have noted in previous hearings, the CRI model development and application was not nearly so strongly collaborative as PATH. The approach by NMFS was to develop models, have public workshops to review them, and modify the models in response to the comments received. In contrast, PATH held far more meetings and workshops, with participation in both being restricted largely to the scientists who were actively working on the analyses.

However, given NMFS' decision to analyze 12 Evolutionarily Significant Units (ESUs) in just over 12 months, the level of collaboration in PATH would have been impossible within that timeframe. PATH required almost 5 years to do a thorough job on two ESU's—Snake River spring/summer chinook and Snake River fall chinook—and a more perfunctory analysis of Snake River steelhead. In addition (see section on PATH, below), in light of recent information, the PATH conclusion regarding drawdown of the lower Snake projects might in the end have been similar to the Bi-Op: do what's feasible to improve anadromous fish passage at the existing hydrosystem, make improvements in other phases of the life cycle, and defer a decision on drawdown.

That having been said in defense of NMFS, the CRI method for population projections clearly has some problems. For anyone trying to follow their analysis from the outside, the many changes over the past year make it very difficult to be certain what version of the model is being used in any given version of the Bi-Op. For example, substantial changes in extinction estimates occurred between the July release of the Bi-Op and the current (September) version. In addition, the so-called "lambda criteria" in the draft Bi-Op (section 9.2.2.1)—that the population growth rate must be at least 10 percent per year, or consultation will be re-initiated—may lead one to believe that growth rates can be estimated very accurately. In fact, as noted above, the growth rates are very imprecise and noisy, because population abundance varies widely from year to year. This makes decision criteria based on growth rates extremely problematic. In fact, for some stocks it appears that even if populations reach recovery levels—several hundred to several thousand spawners—within a decade, the 10 percent growth rate may still not be met.

Finally, for wild stocks that have relatively large numbers of hatchery-origin spawners, the CRI population projections are very sensitive to "hatchery effectiveness." Again, to risk over-simplification, hatchery effectiveness concerns whether or not hatchery-born fish spawning in the wild are as effective as their wild-born cousins at producing viable offspring—fish that will eventually return in the future and spawn. The Bi-Op rightly points to the need to obtain empirical estimates of this for different stocks—at present, the numbers used as a sensitivity are based on pro-

fessional judgment—but is silent on whether or not deliberate supplementation with hatchery fish will continue or not. This question needs to be resolved soon, since many stocks are supplemented heavily at present, and may in fact be sustained largely by hatchery fish.

As with many other uncertainties, one may well wonder why, if it is so important, it has not been the subject of more research. The answer, I think, lies in the ESA focus on wild stocks. NMFS has interpreted this to mean that only wild-born fish "count" when it comes to achieving recovery goals—that supplementation with hatchery fish to sustain a run cannot be part of a long-term management strategy. Therefore, hatchery supplementation can only be used as a safety net to sustain runs over the short term, though the exact definition of "short term" is an open question.

This in turn means that the question of how effective hatchery fish are is very important for future management actions. If effectiveness is very low, then hatchery fish are producing very few progeny, and supplementation is likely a waste of resources. If it is high, and the hatchery-origin fish are helping sustain the runs. The question then becomes whether or not this situation is desirable from a scientific and/or policy perspective.

PATH AND ITS USE IN THE BI-OP

I was closely involved in PATH. While I disagree with many of its conclusions, I feel that I am qualified to make some statements as to how those conclusions stand up to recently available information.

PATH participants analyzed a host of uncertainties, ranging from minor ones having little effect on the models' output to some that turned out to be very important. Among the latter, three stand out as being very influential:

1. Survival rates for juveniles migrating in-river;
2. "D", i.e., survival of transported juvenile fish after release below Bonneville Dam relative to survival of in-river migrants;
3. "Extra" mortality, i.e., mortality not explained by simple life-cycle models or by the effect of downriver passage of juveniles through the hydrosystem.

While the PATH process is, of course, now defunct, these are still relevant, because they are used in the Bi-Op to estimate the effects of drawdown on Snake and Upper Columbia River stocks. In this section, my remarks apply primarily to fish that migrate as juveniles in the spring—spring chinook, summer chinook and steelhead—not to fall chinook. In particular, I am concerned with how PATH conclusions stack up when compared to recently available information.

First, NMFS' recent estimates of in-river survival rates for Snake River spring/summer chinook are substantially higher than those predicted by the passage models (CRISP and FLUSH) used in PATH. In particular, they are 2–10 times higher than those predicted by FLUSH, and somewhat higher than CRISP predictions. Therefore, both passage models to some degree overstated the direct effects of the hydrosystem on Snake stocks, FLUSH by a very substantial margin.

Second, NMFS estimates of "D", while very noisy and imprecise, are higher than those used by either passage model in PATH—somewhat higher than CRISP, and much higher than those used by FLUSH. The implication is that transported fish survive at a higher rate overall—from Lower Granite dam as juveniles back to Lower Granite as adults—than do fish that migrate inriver.

Clearly, in these two areas, PATH predictions are at odds with recent observations. When combined with very high returns of spring chinook this year, they may also be at odds with various PATH hypotheses about extra mortality. In particular, high numbers of returning adults and jacks (immature fish that spend only 1 year in the ocean), combined with other indicators, suggests that an ocean regime shift may have occurred. I say "may" because such shifts have, in the past, lasted for 20 years or more, and a few years of high returns do not a 20-year shift make. If such a shift has occurred, however, it casts serious doubt over the other PATH extra mortality hypotheses—that it is caused by the existence of the Lower Snake dams, or that it is "here to stay" due to diseases transmitted by hatchery fish or some other unknown cause.

All of this casts considerable doubt on PATH's conclusion that dam breaching is clearly the best alternative to recover Snake River stocks. In addition, it has some important implications for the way PATH results are used in the current Bi-Op. Basically, the Bi-Op uses two values for extra mortality when analyzing the effects of drawdown. One version assumes that extra mortality is zero, the other uses an average of the values derived in PATH, and applies this to both Snake and mid/upper Columbia stocks. If the argument outlined above is correct, then the Bi-Op use of PATH results is clearly wrong. This matters because the projected effects of draw-

down manifest themselves primarily via a reduction in extra mortality. Therefore, the value used for this is crucial to predicting the effects of dam removal on fish survival.

UNCERTAINTY IN THE EFFECTS OF BI-OP ACTIONS

The alert reader will have noticed the prevalence of terms such as "imprecise," "noisy," and "uncertain" in much of the text above. In some cases this is simply the nature of the beast. Reasonably reliable salmon abundance data for the Columbia dates back to the closing of Bonneville Dam in 1938. It shows very high variability from year to year, with runs often increasing or decreasing by a factor of 10 over the course of a few years. Reliable life-stage survival rates (at least for Snake River fish) extend back almost a decade, when PIT tag technology was first used, and these too show a high degree of variability. No statistical model or experimental design will make this variability vanish. The best one can hope for is that carefully designed studies will account for it properly. Under some circumstances, clever designs can make some of the variation "cancel out" by controlling for it, while assessing whether management actions work as planned.

The high variability matters when one is trying to assess the effects of management actions. In the next few paragraphs, I discuss two RPA's mandated in the draft Bi-Op, and an uncertainty that is critical to the projected success of the Bi-Op in avoiding jeopardy. I look first at the actions, flow augmentation and offsite mitigation, and then at the potential effects of drawdown.

Flow Augmentation

Recent research by NMFS has found almost no relationship between spring flow and reservoir survival for spring/summer chinook and steelhead juveniles in the Snake. Although high flows are associated with faster downstream migration through the Snake and Columbia reservoirs, this apparently does not lead to increased survival. Given the lack of evidence that higher spring flow leads to higher survivals within the hydropower system, one can fall back on the hypothesis that increased flow may lead to higher survival in the Columbia estuary or in the Columbia River "plume" just off-shore, where fresh water from the river mixes with salt water. Unfortunately, all one can do at present is make guesses about this, because no direct estimates of estuary/early ocean survival are available. It may be possible to obtain estimates of this using so-called sonic tags, where "pingers" are placed in migrating juveniles, and the signals are picked up by an array of floating microphones placed at intervals in the estuary and just off-shore. Personally, I suspect that it will turn out that estuary survival does not vary much with flow for these stocks, but the only way to find out is to do the studies.

Fall chinook which migrate downstream as juveniles in the summer, present a very different picture. NMFS research shows a fairly strong, positive relationship between flow and survival. However, this is confounded with temperature and turbidity. In addition, it is confounded with the date that study fish were released into the river: fish leaving early do better than fish leaving later in the season, and flow decreases over the migration season. Therefore, separating the effects of flow, time of release, etc. using data for years past is impossible. Deliberate manipulation of flows, accompanied by intensive field studies of tagged fish, is the only way I know of to resolve this uncertainty.

Off-site Mitigation

For many stocks, offsite mitigation is a very important part of the Bi-Op's reasonable and prudent alternatives (RPA's). This is because relatively modest changes in survival rates are expected from additional hydrosystem actions. In combination with large increases needed to avoid jeopardy for some stocks, the result is that much of the increase must come from freshwater spawning/rearing improvements. The Bi-Op calls for many actions—screening diversions, reducing subbasin irrigation withdrawals, and the like. Actually measuring the effects of these offsite actions on survival rates will be a complex undertaking.

Previous work I have conducted shows that there are large variations in survival rates from parr (immature fish tagged in their natal streams) to smolts arriving at Lower Granite Dam. More specifically, survival rates vary both across years and across rearing areas with different types of land use. The variation across time and space seems sensible: parr survive at higher rates in cool, moist years than in dry ones, and fish in wilderness areas have higher survival than fish rearing in agricultural areas. However, the variability over time and space is high. Even if the effects of habitat modification are substantial, detecting survival increases will require carefully designed studies that need to start very soon to produce results within the Bi-Op's 5- to 8-year timeframes.

Potential Effects of Drawdown

For Snake River stocks, breaching of the four Lower Snake dams, and perhaps McNary and John Day, is used as the "gold standard" in the Bi-Op: if breaching is undertaken, the action agencies would then have done all they could to reduce the effects of the hydropower system on Snake River stocks. However, a couple of important uncertainties underlie this conclusion. First, recent work by NMFS researchers concludes that for Snake spring chinook and steelhead, survival rates for juveniles migrating through the Snake and Columbia (from McNary to Bonneville Dam) is about the same now as it was before the Lower Snake projects were built. Therefore, it follows that any benefit the fish derive from breaching would come about not because of acute, short-term effects but because of the elusive "extra mortality" noted above. As previously noted, it is my opinion that whatever extra mortality there may have been since the 1970's, it may well vanish if an ocean regime shift results in higher ocean survival. This leads me to be skeptical of the projected biological benefits that may results from breaching. Most scientists, including me, believe that the fish would be better off without dams, but recent information suggests that the benefits are probably quite modest.

WHERE TO GO FROM HERE

While the model wars—a central feature of PATH—have abated to some degree, they still continue on other fronts. For example, the Bi-Op has recently been criticized for not using decision analysis techniques, as was done in PATH. Given the uncertainties outlined above, and many more that I've not gone into here, there are two things of which I am absolutely certain:

1. Computer models and projections, however derived, are no substitute for empirical data.
2. Surprises, both pleasant and otherwise, will be a prominent feature of salmon management and biology for a long time to come.

Given these features of the problem, what should be done in future? First, management agencies in the Columbia have a long history of taking actions largely on faith and best professional judgment. Because they were convinced that the actions would work, they did not monitor the effects to assess their success or failure. This will have to change in the future if we are to retain any credibility with the public and with elected officials. I have identified two actions in the Bi-Op—flow augmentation and offsite mitigation—that I think are especially problematic in this regard. Previous estimates of costs for flow augmentation and water spilled for fish averaged $180 million per year. These assumed electricity prices well below the current market. The Bi-Op's requirements for offsite mitigation are still too general to enable meaningful cost estimates, but actions to reduce withdrawals, screen diversions, and improve riparian habitat will not be cheap. We owe it to ratepayers and taxpayers to monitor the biological consequences of actions closely, to see that these expenditures are having the intended effects.

Second, we need to be humble in the face of our ignorance. Our ability to accurately forecast the future—with or without the effects of new management actions—is very limited. The plethora of models that do such forecasting should not distract one from this. Therefore, one should not place too much confidence in anyone who says "I know what will happen to the fish if we do . . ." The best we can hope for is to continue learning as we go along, and not take predictions—optimistic or pessimistic—too seriously.

Finally, the monitoring called for in the Bi-Op is an enormous undertaking in its own right. Given the scale of the effort involved, I am concerned that there will be a movement to try to monitor everything that swims, creeps, or crawls, since almost anything might be related to problems for ESA-listed stocks. In the absence of some guiding principles—e.g., that monitoring be directed at assessing the effects of Bi-Op actions—I worry that efforts will be too broad, general, and diffuse. If that happens, in 5 to 10 years scientists and policymakers will be rehashing the same arguments about flow augmentation, transportation, hatchery effectiveness, and the like that vex us today. Instead, I would recommend a set of closely monitored management experiments to see what works and what doesn't. Unless this is the foundation for future research efforts, money spent on monitoring will be money down the drain.

REFERENCES

NMFS, March 2000. Salmonid travel time and survival related to flow in the Columbia River. Concludes that there is almost no relationship between flow and survival for spring migrants, and a highly confounded relationship for fall chinook.

NMFS, April 2000. Passage of juvenile and adult salmonids past Columbia and Snake River dams. Concludes that current juvenile passage survival is similar to that in the 1960's, before the Snake River dams were constructed.

NMFS, April 2000. Summary of research related to transportation of juvenile anadromous salmonids around Snake and Columbia River dams. Contains "D" estimates for Snake River fish.

Paulsen, C. and T. Fisher. Statistical relationship between Snake River spring/summer chinook salmon parr-to-smolt survival and indices of land use. In press, Transactions of the American Fisheries Society. Demonstrates that juvenile survival from Parr to smolt varies widely across years and tagging locations.

Oosterhout, G. Analysis of a decision: A critique of the National Marine Fisheries Service's draft Biological Opinion on the Operation of the Federal Columbia River Hydropower System, from the perspective of the sciences of decision analysis and risk assessment. Criticizes the draft Bi-Op for the failure to use decision analysis techniques.

Paulsen, C. and R. Hinrichsen. Experimental Management for Snake River Spring/Summer Chinook: Trade-offs Between Conservation and Learning for a Threatened Species. In review, *Canadian Journal of Fisheries and Aquatic Sciences* examines how many years would be required to detect the effects of a variety of management actions.

STATEMENT OF KARL J. DREHER, DIRECTOR, IDAHO DEPARTMENT OF WATER RESOURCES

Mr. Chairman, my name is Karl Dreher. I serve the State of Idaho as the Director of the Idaho Department of Water Resources, a position that I have held since 1995.

I appreciate your invitation to testify at this hearing and would like to share with you some of my concerns with the Draft Biological Opinion on Operation of the Federal Columbia River Power System ("Draft Bi-Op") released by the National Marine Fisheries Service ("NMFS") on July 27, 2000. My comments focus on two aspects of the Draft Biological Opinion: (1) the inadequacy of the science relied on by NMFS in continuing to call for flow augmentation in the mainstem of the Snake River; and (2) the flawed analysis conducted by NMFS in assessing the effects of the Bureau of Reclamation projects in the Upper Snake River Basin.

1. INADEQUACY OF SCIENCE USED TO JUSTIFY FLOW AUGMENTATION IN THE MAINSTEM SNAKE RIVER

Figure 1 shows the historical record of average daily flows in the Snake River near the site of Lower Granite Dam, since records have been kept, during the spring time period (April 10 through June 20) for which NMFS has established a target flow objective for the Snake River at Lower Granite Dam to aid outmigrating spring/summer chinook salmon. Similarly, Figure 2 shows the historical record of average daily flows in the Snake River during the summer time period (June 21 through August 31) during which NMFS has established a target flow objective in the Snake River to aid outmigrating fall chinook salmon.

To assist in evaluating these historical flows, a linear trend line was calculated during each of the spring and summer target flow periods. The striking conclusion that can clearly be drawn from these data is that despite the increasing development of irrigated agriculture in the Snake River Basin, despite the development of municipal and industrial water supplies, despite the upstream development of hydroelectric power plants, despite the construction of Dworshak Reservoir for flood control, and despite the construction of Bureau of Reclamation storage reservoirs in the Upper Snake River Basin, flows have not changed significantly. During the spring target flow period, average daily flows range from about 50,000 cfs to about 170,000 cfs; from prior to 1920 to the current time. During the summer target flow period, average daily flows range from about 20,000 cfs to about 70,000 cfs; again from prior to 1920 to the current time.

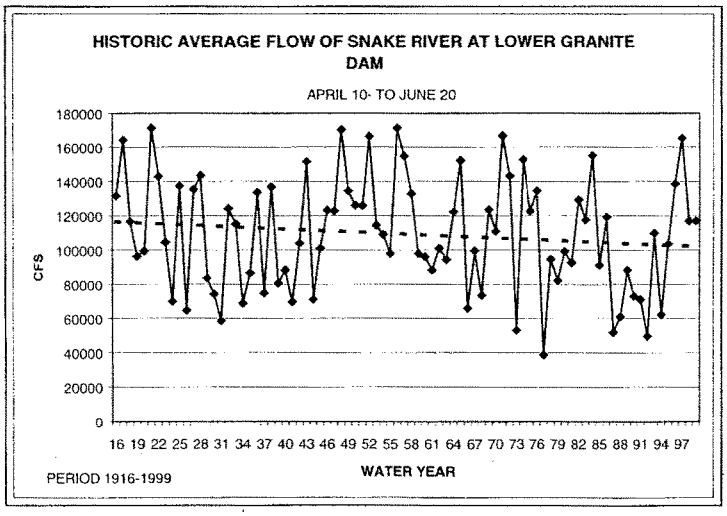


Figure 1. Average Daily Flows in the Snake River Near Lower Granite Dam During Spring Target Flow Period

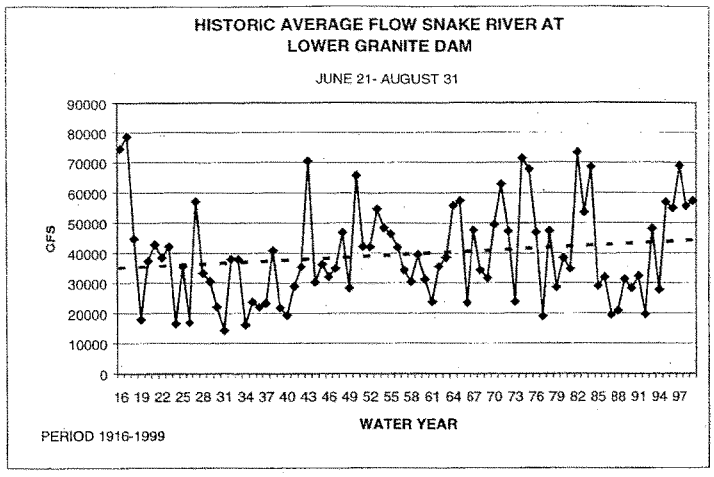


Figure 2. Average Daily Flows in the Snake River Near Lower Granite Dam During Summer Target Flow Period

The lack of dramatic change in flows is significant because analyses conducted by the Process for Analyzing and Testing Hypotheses ("PATH") concluded that the productivity of Snake River spring/summer chinook populations remained healthy through the 1950's and into the 1960's. Consequently, changes in Snake River flows can't have contributed to the loss of salmon productivity (because the flows haven't changed), and it should not be expected that increasing flows will significantly improve salmon productivity because there have been no significant flow depletions to contribute to the loss of productivity.

If flows have not changed during the time period when salmon productivity declined to the point that Snake River salmon and steelhead stocks were listed under the Endangered Species Act, what has changed? Figures 3 and 4 show the historic record of average daily flows during the spring and summer flow time periods to-

gether with a parameter termed "water particle travel time"[1], which is a surrogate parameter for average velocity.

These figures show that prior to the construction of the four Federal Columbia River Power System ("FCRPS") dams on the Snake River above its confluence with the Columbia River, water particle travel time, and hence the average velocity of river flow, were largely independent of flow. Since the construction of the four FCRPS dams, which have transformed a formerly free-flowing river into a series of reservoirs, thereby increasing the cross-section of the river, the average velocity of river flow has been slowed by an order of magnitude and is now significantly dependent on flow.

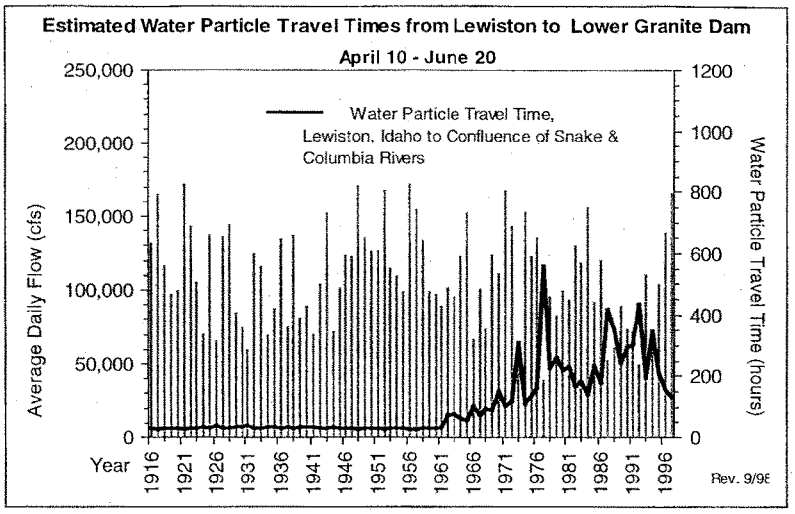


Figure 3. Average Daily Flows in the Snake River Near Lower Granite Dam and Water Particle Travel Time During Spring Target Flow Period

[1] Water particle travel time is the theoretical length of time that it would take a particle, suspended in a volume of water flowing at a given rate, to travel some specified distance. An average velocity can be calculated by dividing the specified distance by the water particle travel time. The specified distance in this instance is the length of the river segment from between the confluence of the Clearwater and Snake Rivers to the confluence of the Snake and Columbia Rivers, about 140 miles.

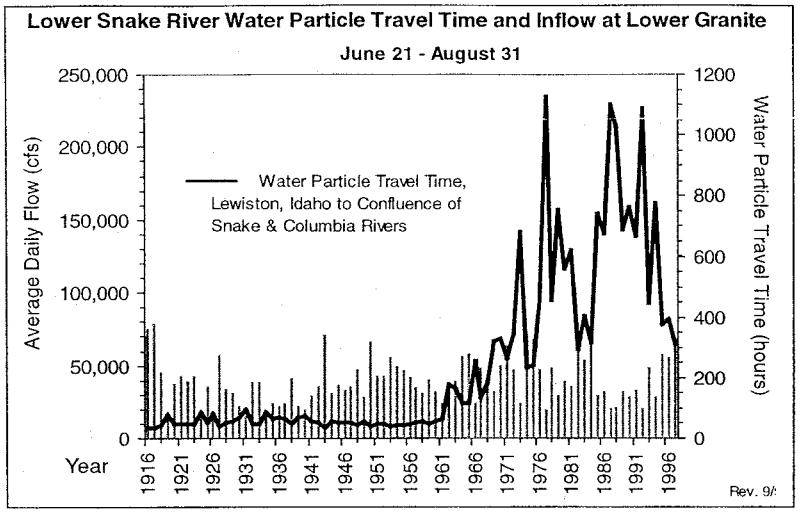
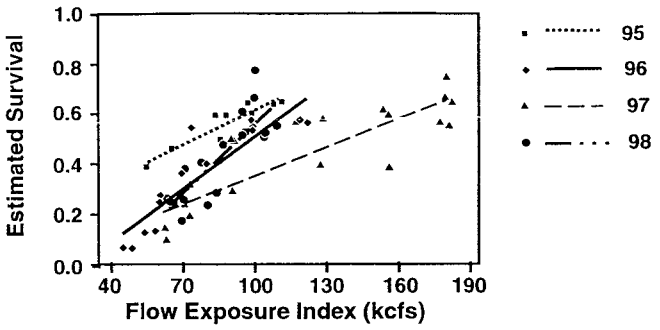


Figure 4. Average Daily Flows in the Snake River Near Lower Granite Dam and Water Particle Travel Time During Summer Target Flow Period

This slowing of river flows following construction of the four FCPRS dams, coupled with observations that improved adult returns are generally associated with good water years (i.e., high natural flow and spill) during juvenile outmigration, have led to the hypothesis that augmenting flows in the mainstem Snake River will increase flow velocities, decrease the travel time of outmigrating smalls by pushing them downstream, and thus improve their survival. However, there has been little recognition by NMFS in the Draft Bi-Op and supporting documents that flow augmentation can only provide small and probably insignificant increases in flow velocities.

In part to test the hypothesis that flow augmentation improves survival of outmigrating juvenile salmon by speeding downstream migration, NMFS, the U.S. Fish and Wildlife Service, and the Nez Perce Tribe investigated migration characteristics of hatchery-raised, spring/summer and fall chinook salmon in the Snake River using hatchery-raised juveniles as surrogates for wild juveniles. The studies were conducted during the period from 1995 through 1998 and showed that estimated survival from points of release to the tailrace of Lower Granite Dam could be correlated with all three environmental variables examined (flow rate, water temperature, and turbidity), at least for fall subyearlings, as shown in Figure 5. Estimated fall subyearling survival decreased throughout the season, as flow volume and turbidity decreased and water temperature increased. These correlations have been used by NMFS as the primary basis in the Draft Bi-Op for the continuation of flow augmentation from reservoirs in the Snake River and Clearwater River Basins to aid outmigrating juvenile subyearling fall chinook salmon.



Adapted from NMFS White Paper on Salmonid Travel Time and Survival Related to Flow in the Columbia River Basin, March, 2000

Figure 5. Estimated Survival Versus Flow for Outmigrating Fall Chinook

However, an elementary principal of statistics is that correlation between variables does not equate to cause and effect. Based on an analysis of the 1995–1998 data relied on by NMFS, these data do not support a conclusion that higher flows achieved by use of flow augmentation cause an increase in survival. Attached to this written statement is a copy of the executive summary from a recent collaborative study completed by the Idaho Department of Water Resources, the Idaho Water Resources Research Institute (University of Idaho), and the Idaho Department of Fish and Game. Using the 1995–1998 data relied on by NMFS, it was found that most of the hatchery-raised fall chinook surviving to Lower Granite Dam traveled faster, not slower, during lower flows. This is shown in Figure 6 below and is completely opposite of what would be expected if incrementally higher flow velocities caused increased survival.

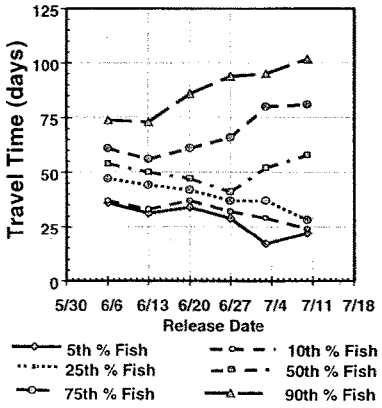


Figure 6. Subyearling Fall Chinook Travel Time for 1996 Clearwater Releases

Current data do not provide a sufficient basis for concluding that the relatively high mortality occurring after the release of hatchery-raised fish, especially from later releases, is related to flow rate. An inability to transition from a cultured environment to a natural environment may result in high mortality shortly after release. This post-release mortality is incorporated into survival estimates. If it is relatively high, this initial mortality could strongly influence observed survival patterns, even when the cause of mortality cannot be shown to be related to flow conditions. For example, water temperature differentials between the hatchery and the river release sites were not constant among release groups. The temperature differential was relatively minor for early releases, but more dramatic for later release groups. Although fish were acclimated prior to release, and acute mortality monitored in net pens, the additional thermal stress on later release groups may have

contributed to lower observed survival at Lower Granite Dam than for earlier release groups. Another variable—that is termed herein as "readiness to migrate"—may also have influenced hatchery-raised, fall chinook migration rates and survival. Fish from the early release groups may have been released prior to the time of optimal physiological conditions for migration and, therefore, migrations were delayed. Evidence for this possibility is the delay between dates of release and dates of detections at Lower Granite Dam for early releases as compared to later releases. Subyearlings from the later release groups may have been released at the end of, or after, their optimal physiological time for migration, although a few of the fish from late releases appeared to "catch up," as shown by faster travel times, despite lower flow conditions, as compared with earlier releases.

The inadequacy of the studies used by NMFS to investigate survival under varying flow conditions does not suggest that flow, specifically the attributes of flow (water velocity, temperature, and turbidity), are unimportant to migration and survival of juvenile salmon. However, flow rates, velocity, temperature, and turbidity are closely correlated with one another within the 1995–1998 data set used by NMFS to justify continued flow augmentation in the Draft Bi-Op, and the current data are insufficient to allow delineation of the effects of individual attributes of flow. Understanding the effects of individual attributes of flow, particularly the usefulness of flow augmentation to compensate for the effects of reservoir impoundment on these attributes, is fundamental to determining the effectiveness of flow augmentation efforts for increasing survival of juvenile salmon. For example, if cooler water temperatures are important to improving the survival of juvenile subyearling fall chinook salmon, using relatively warm water from the Upper Snake River to augment flows may be counterproductive and may harm subyearling fall chinook if river flows augmented with water from the Upper Snake River Basin are warmer than what would have occurred without flow augmentation from the Upper Snake.

2. FLAWED ANALYSIS ASSESSING EFFECTS OF BUREAU OF RECLAMATION PROJECTS

The Draft Bi-Op discusses the flow depletion effects of irrigation stemming from Bureau of Reclamation ("BOR") projects in the Upper Snake River Basin and concludes that: "Flow depletions caused by BOR-based irrigation are a major impediment to meeting NMFS's flow objectives." Bi-Op at 6–28. This assertion is based on two analyses: (1) the estimated monthly average water consumption of crops at BOR irrigation projects upstream of McNary Dam; and (2) the percentage of years that simulated mean monthly flows at certain other dams are not met as a result of BOR-based irrigation. These analyses contain factual errors, apply fundamentally flawed logic in defining the effects of the action, and present a grossly misleading picture of the flow impacts of Bureau operations.

The conceptual flaw in the approach used by NMFS to assess BOR impacts is that the approach focuses on the time that reservoir storage is released during the irrigation season and the consumptive use by the crops irrigated by this water. Because irrigation occurs primarily during the salmon migration season, NMFS assumes that BOR projects have a substantial effect on flows during the migration season. This approach overlooks a simple but absolutely crucial fact: most of the water released from BOR reservoir storage space for irrigation purposes was stored after the irrigation season during the winter and high run-off periods in the spring. Without storage in a BOR reservoir, the water would have flowed downstream and would not have been in the river at the time that it is delivered for irrigation. Thus, water stored during the winter and spring that is released for irrigation in the summer does not reduce natural flows during salmon migration periods, but may actually increase flows during salmon migration since a substantial portion—roughly half—of the stored water that is released for irrigation finds its way back to the river as return flow. To correctly determine the effect of BOR reservoirs, NMFS must look to the volume and timing of both reservoir storage and return flows during the salmon migration periods.

In wrongly determining the percentage of years that operation of the BOR projects would cause a failure to meet flow objectives at Lower Granite and other dams based on a 50-year period of record (1929–1978), the Draft Bi-Op uses a comparison of flows under current BOR operations with flows under a simulated "without BOR depletion" scenario. Bi-Op at 6–31. Two flaws in the NMFS analysis are readily apparent. First, the amount of depletion caused by BOR-based irrigation is overstated by approximately 50 percent. NMFS failed to distinguish between full service lands, which use Bureau storage as a primary water supply, and supplemental lands, which rely on Bureau storage as a secondary source. The difference in water use patterns between the two types of lands can be substantial. For instance, full service lands in the Boise River Basin used 2.18 acre-feet of storage per

acre, while supplemental lands used 0.66 acre-feet of storage water per acre. NMFS simply assumed that all lands used Bureau storage as their sole source of water. Second, the analysis of the percentage of years that operation of the BOR projects would prevent meeting flow targets continues the error of basing the analysis on agricultural depletions rather than actual reservoir storage and return flows. The analysis calculates the total depletion due to all agriculture, assigns a fraction of that total depletion to BOR-based irrigation, and assumes that the BOR-based depletion occurs primarily during the salmon migration season. As explained previously, this overlooks the distinction between the timing of diversions to reservoir storage, which deplete flows at the time storage occurs, and diversions pursuant to natural flow water rights, which deplete flows at the time the diversion occurs.

This Draft Bi-Op analysis also reveals another basic misconception in the NMFS analysis of BOR impacts. In developing the "without BOR depletions" scenario, NMFS eliminated all irrigation storage, diversions, and return flows. This "predevelopment" scenario stretches the available data and analytical tools well beyond their reliable use, and places the entire analysis well into the realm of speculation. Unfortunately, NMFS then took the analysis one stunning step further; it assumed that the BOR reservoirs would remain in place and would be actively employed solely to augment flows for salmon. In other words, NMFS calculated the effects of operating the BOR projects on streamflow as the sum of: (1) the depletions that NMFS attributed to BOR-based irrigation; and (2) the volume of water that would have been available if the BOR reservoirs were actively operated solely to augment flows. Thus, NMFS treated the failure to dedicate Bureau reservoirs to flow augmentation as an "effect of the action" for the operation of Bureau projects. The Endangered Species Act does not allow NMFS to measure the effects of the operations at BOR projects against some artificial scenario that sweeps agriculture from the landscape of southern Idaho and then assumes that Congress would have authorized and funded major water projects for fish flow augmentation purposes.

3. INSUFFICIENT COLLABORATION WITH REGIONAL AND LOCAL INTERESTS

Mr. Chairman, I recognize the breadth of disagreements on these issues and others among scientists employed by Federal, State, and local governmental entities, as well as scientists associated with other interest groups. However, given the significance of salmon recovery to the Pacific-Northwest and the Nation, coupled with the inevitable costs of recovery actions, the limited collaboration that has occurred with regional and local interests has been wholly inadequate. Had adequate collaboration occurred, the insufficiencies in the science I have described could have been addressed before the Draft Bi-Op was finalized. While NMFS may address these flaws to some extent in the ensuing final Biologic Opinion, the lack of adequate collaboration has undoubtedly increased the likelihood and scope of subsequent litigation—litigation which will only serve to slow implementation and diminish the effectiveness of meaningful and feasible recovery actions.

Thank you for inviting me to testify today. I would be pleased to answer your questions or provide any supplemental information your subcommittee may find useful.

REVIEW OF SURVIVAL, FLOW, TEMPERATURE, AND MIGRATION DATA FOR HATCHERY-RAISED, SUBYEARLING FALL CHINOOK SALMON ABOVE LOWER GRANITE DAM, 1995–1998[1] (PREPARED BY KARL J. DREHER, P.E., DIRECTOR, IDAHO DEPARTMENT OF WATER RESOURCES; CHRISTIAN R. PETRICH, P.E., RESEARCH SCIENTIST, IDAHO WATER RESOURCES RESEARCH INSTITUTE, UNIVERSITY OF IDAHO; KENNETH W. NEELY, TECHNICAL HYDROGEOLOGIST, IDAHO DEPARTMENT OF WATER RESOURCES; EDWARD C. BOWLES ANADROMOUS FISH MANAGER IDAHO DEPARTMENT OF FISH AND GAME; ALAN BYRNE, SENIOR FISHERIES RESEARCH BIOLOGIST, IDAHO DEPARTMENT OF FISH AND GAME)

EXECUTIVE SUMMARY

The National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service, and the Nez Perce Tribe have investigated migration characteristics of hatchery-raised, subyearling fall chinook salmon (Oncorhynchus tshawytscha) in the Snake River Basin from data collected from 1995 through 1998 (Muir et al., 1999). The studies showed that estimated survival from points of release to Lower Granite Dam

[1] Entire report is available from: http://www.idwr.state.id.us (see listing on home page), or http://www.idwr.state.id.us/info/pio/issues/IDWR-IDFG%20Flow%20&%20'survival%20Review.pdf.

could be correlated with three environmental variables: flow, water temperature, and turbidity. These correlations are being used in support of flow augmentation in the lower Snake River.

This report provides a review of the data used for comparing subyearling survival to flow rates, water temperature, time of release, and travel time. The principal conclusion of the review is that survival data and flow rates used by Muir et al. (1999), despite showing an apparent correlation between flow rates and survival, do not imply a cause and effect relationship between flow and survival of subyearlings and should not be used as a basis to justify flow augmentation. This is primarily because the experimental design did not address other factors that appear to have strongly influenced migration characteristics and survival.

There is a fourfold basis for this conclusion. First, although flow can be correlated with survival, there is a stronger correlation between estimated survival and release date. The NMFS experimental design assumed that sequential releases of hatchery-raised fall chinook would not influence survival independent of flow, temperature, and turbidity. The high correlation between time of release and survival makes this assumption questionable.

Second, travel times for hatchery-raised, subyearling fall chinook did not correspond with flow rates. For instance, travel times for the early percentile surviving fish (5th, 10th, and 25th percentiles) were less at lower flows than at higher flows for most releases. Median travel time for the fifth percentile surviving fish decreased from 33 days to 16 days between the first and sixth weekly releases, despite a decrease in the fifth percentile flow indices during the same time from 122,000 cubic feet per second (kcfs) to 63 kcfs. These travel times and arrival patterns were contrary to what would be expected if the higher flows resulted in significant improvements in survival.

The fact that travel times are inconsistent with flow rates may result from (1) the migration rate being weakly dependent on flow in the flow ranges considered or (2) other important non-flow factors influencing migration rate. An example of a non-flow factor is "readiness to migrate." The NMFS study used hatchery-raised, subyearling fall chinook as surrogates for wild fish. Implicit in the use of these hatchery-raised subyearlings in sequential weekly releases is that the fish are equally "ready to migrate" when released. Longer travel times for portions of early released subyearlings, and faster travel times for portions of later-released subyearlings, despite substantially decreasing flows, suggests that the fish in the weekly sequential releases may not have been equally "ready to migrate." Differences in States of "readiness to migrate" would confound the analysis of flow and survival relationships. Correlations of flow and temperature with travel time and survival are only meaningful if the groups of fish studied are actively migrating or relatively similar in their State of "readiness to migrate."

Third, flow rates, velocity, temperature, and turbidity are closely correlated with one another (NMFS, 2000). The current data are insufficient to allow delineation of the effects of individual attributes of flow. Understanding the effects of individual attributes of flow, particularly the usefulness of flow augmentation to compensate for the effects of reservoir impoundment on these attributes, is fundamental to determining the effectiveness of flow augmentation efforts for increasing survival of subyearling fall chinook salmon.

Fourth, additional problems with existing studies must be addressed prior to making conclusions about the efficacy of flow augmentation. These include use of flow and temperature indices that do not represent overall migration conditions; release timing of hatchery-raised fish that is not representative of natural migration; relatively high post-release mortality; and the inability of reach survival estimates to reflect the full spectrum of potential effects from altered water velocities, temperatures, and turbidity during migration (e.g., altered migration timing, bioenergetics, and transition into the estuary and ocean).

In summary, this review does not suggest that flow, or the attributes of flow (water velocity, temperature, and turbidity), are unimportant to migration and survival of subyearling fall chinook salmon. However, existing correlations between survival of hatchery-raised, subyearling fall chinook salmon with flow rates and water temperatures do not support the postulation that augmenting mainstem Snake River flows improves subyearling survival.

November 1, 2000.

PN–1070 ADM–1.10

Ms. DONNA DARM, *Acting Regional Director,*
National Marine Fisheries Service
7600 Sand Point Way NE
Bin C15700
Seattle, WA

SUBJECT: State of Idaho's Comments on the Draft Biological Opinion

DEAR MS. DARM: We have reviewed Idaho's comments, provided on September 29, 2000, on NMFS draft Biological Opinions (BO) on operation of the Federal Columbia River Power System. Idaho's continents cover the range of issues addressed in the Draft BO, including definition of the action, scope, biologic issues, and effects of Reclamation projects.

We find Idaho's comments on Chapter 6 of the draft BO (effects of the Action) to be generally consistent with comments Reclamation provided to NMFS on October 5, 2000. Idaho's hydrologic analysis summarized in figures 2 through 5 in Part 1 of their comments are both factual and based on a more sophisticated analysis than that previously undertaken. Idaho's comments represent a major improvement in identifying the true effects of Bureau of Reclamation storage operations.

We encourage NMFS to seriously consider this more complete analysis in revising the BO.

Sincerely,

J. WILLIAM MCDONALD, *Regional Director.*

STATEMENT OF RUSSELL F. THUROW, CERTIFIED FISHERIES SCIENTIST, BOISE CITY COUNCIL CHAMBERS, BOISE, ID

Thank you Mr. Chairman and members of the subcommittee. I appreciate the opportunity to submit testimony on the draft Biological Opinion and Recovery Strategy. My name is Russ Thurow, I am a Fisheries Research Scientist with the Rocky Mountain Research Station. Although I am currently an employee of the U.S. Forest Service, I am submitting these comments as an individual and they represent my professional assessment. My testimony does not represent the Forest Service or the Administration's position. My professional career spans nearly 28 years of researching salmonid populations and their habitats. My comments today are based on 20 years of experience working with chinook salmon and steelhead in the Snake River basin, specifically in central Idaho's Salmon River drainage.

I find the approach outlined in the Biological Opinion and Recovery Strategy flawed and scientifically indefensible. In this testimony, I want to focus specifically on the scientifically indefensible conclusion that Snake River anadromous fish stocks can be recovered through restoration of freshwater spawning and rearing habitat. I will demonstrate that the preponderance of scientific evidence illustrates this approach is infeasible and will fail to meet recovery goals under ESA for Snake River stocks.

I want to begin by revisiting the status of Snake River Basin anadromous fish:

1. As recently as the early 1970's, the Snake River basin supported sport fisheries for wild chinook salmon and summer steelhead (IDFG 1992).

2. Since the mid 1970's, ALL stocks of anadromous fish in the Snake River basin, including Pacific lamprey, have declined precipitously.

3. Abundant evidence suggests human activities and specifically hydropower development, is the proximate cause of the post-1970 declines. Declines in stock productivity have coincided with the development and operation of the Columbia River hydropower system (Schaller et al. 1999). As a result, a concentrated effort has been applied to improve survival through passage technology, smolt transportation, and flow augmentation (IDFG et al. 1990). It is also apparent that a decline in ocean productivity occurred in the late 1970's (Pearcy 1992). The cumulative effects of a naturally cyclical fluctuation in productivity and increased mortality as a result of the hydropower system interacted to severely reduce stock productivity.

4. Despite nearly 30 years of efforts to improve passage through the hydra system, the stocks have continued to decline. Snake River sockeye salmon were federally listed under the Endangered Species Act in 1991, spring, summer, and fall chinook salmon in 1992, and summer steelhead in 1997. The 1995 chinook salmon read counts were the lowest on record in the basin (Elms-Cockrom 1998) and all stocks remain imperiled.

5. Although opinions on the most effective means of recovery vary, it is clear that substantial improvements in survival must occur if Snake River stocks are to be re-

stored. The 1995–1998 National Marine Fisheries Service Biological Opinion on operation of the Columbia River hydrosystem created the PATH (plan for analyzing and testing hypotheses) process to assist managers in making long-term hydra system decisions necessary to ensure survival and recovery of Snake River stocks (NMFS 1995). PATH, which represents the most collaborative and peer reviewed analysis, concluded a 2.7 fold improvement in survival is necessary for recovery of Snake River spring/summer chinook salmon (Peters and Marmorek 2000).

The approach outlined in the Biological Opinion and Recovery Strategy suggests the best opportunities to improve survival and restore Snake River anadromous fish stocks lie in the freshwater spawning and rearing areas, specifically in improving egg-to-smolt survival. Using wild Middle Fork Salmon River stocks as an example, I will illustrate why that approach is flawed, infeasible, and will not recover Snake River stocks. I am sure Senator Crapo is familiar with the Middle Fork Salmon River, since 1930 the area was managed as the Idaho Primitive Area. In 1980 the Central Idaho Wilderness Act established a 2.2-million acre wilderness that remains the largest contiguous wilderness in the lower 48 States. I am intimately familiar with this drainage and its fish populations. Twenty years ago I began an intensive fisheries investigation of anadromous and resident salmonids there (Thurow 1985). Since then I have personally surveyed all of the nearly 600 miles of spawning and rearing habitat accessible to anadromous fish in the drainage (Thurow 2000a). The trends in Middle Fork Salmon River salmon and steelhead populations are consistent with the facts I listed earlier: since the mid-1970's salmon and steelhead populations declined precipitously, the sport fishery has remained closed, and the stocks remain at risk.

Focusing on restoration of freshwater spawning and rearing habitat will not recover Snake River stocks because:

A. Losses in the egg to smelt stage have not been the cause of declines in Snake River stocks. Analysis of numbers of wild Snake River basin chinook salmon spawning adults and smelts produced indicates mortality in this life stage has not changed substantially from the 1960's to present (Petrosky and Schaller 1996; Stufa 2000). The number of young salmon or recruits produced per spawning salmon has remained fairly consistent or slightly increased. Comparisons of stock trends in wilderness and degraded habitats also corroborate the fact that changes in spawning and rearing habitat quality have not been responsible for stock declines. If freshwater habitat were the primary cause for declines, then stocks in high quality habitats should be faring substantially better than stocks in degraded habitats. The preponderance of evidence demonstrates this is not the case. Snake River chinook salmon read counts in both wilderness and degraded habitats have similarly declined since the mid 1970's (Hassemer 1993).

B. Habitat conditions in the Middle Fork Salmon River have remained the same or improved since the 1960's. The primary past human activities that degraded habitat in the Frank Church Wilderness were associated with mining and livestock grazing. The 1980 wilderness designation banned all dredge and placer mining. Livestock grazing management has improved and restoration of riparian areas is in progress in the Marsh, Camas, and Bear Valley creek drainages. In the 1930's biologist William Chapman surveyed salmon habitat across the Columbia River basin. He wrote: "the Middle Fork of the Salmon possesses immense spawning areas for spring chinook which to my knowledge are not surpassed or even reached in quantity or quality any place else in the Columbia River drainage." (Chapman 1940). Those immense and high quality areas remain today and I invite the members of this committee to visit them.

C. In high quality habitats like those that exist in most of the Middle Fork Salmon River, there is virtually no opportunity to substantially improve egg-to-smolt survival of fish spawning in the wild. Biologists know that much of the freshwater mortality occurs during the winter. Salmon evolved to produce between 4,000 and 6,000 eggs per female, and although survival rates vary, even in the best habitats most of these eggs and fry do not survive. A recent article in Science by Kareiva and others (Kareiva et al. 2000) has received a lot of attention. Although the authors performed an interesting modeling exercise, there are two major errors in the paper: (1) the authors emphasize improving egg-to-smolt survival to restore Snake River stocks without considering the feasibility of actually making those improvements; and (2) the authors fail to acknowledge that declines in Snake River stocks have not been caused by reductions in the egg-to-smolt life stage. I challenge the individuals who are advocating freshwater habitat restoration as a means to restore Snake River chinook salmon to visit the Middle Fork Salmon River habitats and explain how they would achieve a 2.7-fold improvement in survival.

D. The life stage where the largest increases in mortality have occurred as a result of human activities is in the smolt-to-adult stage. Smolt-to-adult return rates

for Snake River stocks declined from more than 4 percent in 1968 (Raymond 1979) to less than 0.7 percent in the 1990's (Marmorek et al. 1998; STUFA 2000). In 1992, for example, smolt-to-adult return rates were estimated to be less than 0.2 percent (STUFA 2000). The smolt-to-adult life stage offers the best opportunity to reduce mortality and restore survival to a level necessary to meet recovery goals. Comparisons of downriver stocks with Snake River stocks corroborate the strong influence of migration corridor mortality. Snake River stocks above eight dams are faring about ⅓ as well as downriver stocks above 3 dams (Schaller et al. 1999; Deriso et al. 1996). As further corroborative evidence, during years of high stream flows and improved passage conditions, differences in mortality rates between downriver and upriver stocks narrow (Derive et al. 1996; IDFG 2000). If freshwater habitat quality or ocean condition fluctuations were the proximate causes of mortality, this shrinking of the differences in mortality between up and downriverstocks with higher flows would not be expected.

These points clearly illustrate that changes in the egg-to-smolt life stage in freshwater spawning and rearing habitat are not responsible for the declines in Snake River stocks. Rather, the declines since the mid-1970's have been caused by increased mortality in the smolt-to-adult life stage. The problem lies not in the quality of spawning areas but in the lack of sufficient numbers of adults successfully returning to spawn. Consequently, freshwater habitat restoration will not recover Snake River stocks.

Does this mean spawning and rearing habitats are not important? Certainly not. The Interior Columbia River Basin Ecosystem Management Project (ICBEMP) Aquatic Science Team concluded that high quality freshwater habitats are extremely critical to the persistence of native resident and anadromous salmonids. Native salmonids have generally fared best in the areas least disturbed by humans and many high quality habitats, especially those in designated wilderness or roadless areas, represent the only remaining strongholds for native species (Lee et al. 1997). For Snake River anadromous stocks in the short term, because of the habitat and population losses associated with the hydra system, only the most productive populations may retain the resilience to persist in the face of natural and human caused disturbance (Lee et al. 1997; Thurow et al. 2000b). Restoration of degraded habitats will also benefit some Snake River fish populations. Any changes in the environment that increase survival and productivity of Snake River stocks will improve chances for persistence (Emlen 1995; NRC 1996). In the Yankee Fork and Lemhi rivers, for example, restoration of more natural stream flows and spawning gravels will benefit both resident and anadromous stocks. However, while high quality spawning and rearing habitat is key to stock persistence, freshwater habitat restoration will not restore widely ranging Snake River anadromous stocks, especially those in areas already supporting good quality habitat. The ICBEMP Aquatic Science Team reported, for example, that despite supporting some of the highest quality freshwater habitat in the entire Columbia River basin, the central Idaho wilderness contains no strong populations of anadromous fish (Huntington et al. 1996; Lee et al. 1997).

Another NMFS document, the so-called All-H paper (NMFS 2000), provides the final piece of supporting information to illustrate why Snake River stocks will not be restored by freshwater habitat restoration. The All-H paper logically prioritizes subbasins for habitat restoration based on need and opportunities for success. I refer to the Table on page 15 of Volume 2 (NMFS 2000) that lists "Highest priority subbasins and costs for fiscal year 2001 habitat restoration". Not a single subbasin supporting Snake River stocks of chinook salmon, sockeye salmon, or summer steelhead was prioritized for habitat restoration? Why? Precisely for the reasons stated earlier, because most of the basins already support habitat of good to high quality, only modest benefits would be realized from freshwater habitat restoration efforts. I quote from page 17 of Volume 2 (NMFS 2000),

> Subbasins above the four Snake River dams were given a lower priority for investments in habitat restoration projects because adult anadromous fish escapement during the last decade has not been sufficient to seed existing Federal habitat. Generally, anadromous and resident fish habitat quality of Federal land in the Snake River Basin is considered to be in good condition. Approximately 70 percent of the priority watersheds with listed anadromous fish are in wilderness or roadless areas.

In summary, the Biological Opinion and Recovery Strategy make a critical error in focusing on the egg-to-smolt life stage as the area of emphasis. This approach is not feasible and will fail to recover Snake River anadromous fish. If Snake River anadromous fish stocks are to be recovered, then the Biological Opinion and Recov-

ery Strategy must change its approach and emphasize measures to restore survival in the smolt-to-adult life stages to a level necessary to meet recovery goals.

Society has spent billions of dollars in efforts to restore Columbia River basin anadromous fish because of their cultural and economic importance. These efforts, though well intentioned, have not been effective and the stocks continue to decline. I believe the draft Biological Opinion and Recovery Strategy is scientifically indefensible and misleads the public by asking them to believe freshwater habitat restoration will recover Snake River salmon and steelhead. It is not too late to correct this error, to refocus the effort on restoring survival in the smolt-to-adult life stage, and to get on with the business of recovering these stocks.

Thank you for the opportunity to participate in this critical process that will ultimately determine the fate of Snake River native fishes.

LITERATURE CITED

Chapman, W.M. 1940. Report of a field trip to the Snake River drainage in Idaho and Eastern Oregon, 1940. Washington Department of Fisheries. Olympia.

Deriso, R., D.R. Marmorek, and I. Parnell. 1996. Retrospective analysis of passage mortality of spring chinook of the Columbia River. In Marmorek, D.R. and 21 coauthors. 1996. Plan for Analyzing and Testing Hypotheses (PATH): final report of retrospective analysis for fiscal year 1996. ESSA Technologies Ltd., Vancouver, B.C.

Elms-Cockrom, T.J. 1998. Salmon spawning ground surveys, 1997. Pacific Salmon Treaty Program. Award No. NA77FP0445. Idaho Department of Fish and Game. Boise.

Emlen, J.M. 1995. Population viability of the Snake River chinook salmon (Oncorhvnchus tshawytscha). Canadian Journal of Aquatic Sciences 52: 1442–1448.

Hassemer, P.F. 1993. Salmon spawning ground surveys, 1989–1992. Project F–73-R–15. Idaho Department of Fish and Game. Boise.

Huntington, C.W.; Nehlsen, W.; Bowers, J. 1996. A survey of healthy native stocks of anadromous salmonids in the Pacific Northwest and California. Fisheries. 213: 6–15.

IDFG (Idaho Department of Fish and Game), Nez Perce Tribe of Idaho, Shoshone-Bannock Tribes of Fort Hall. 1990. Salmon River subbasin salmon and steelhead production plan. Boise, ID.

IDFG (Idaho Department of Fish and Game). 1992. Anadromous fish management plan 1992–1996. Idaho Department of Fish and Game. Boise, ID.

IDFG (Idaho Department of Fish and Game). 2000. Comments Regarding Jeopardy Analysis and Biological Requirements of Listed Species. September 29, 2000. Part II of State of Idaho Comments on Draft Biological Opinion on Operation of the Federal Columbia River Power System Including the Bureau of Reclamation's 31 Projects, including the Entire Columbia Basin Project (dated July 27, 2000).

Kareiva, P., M. Marvier, and M. McClure. 2000. Recovery and management options for spring/summer chinook salmon in the Columbia River Basin. Science. Vol. 290 977–979.

Lee, D., Sedell, J., Rieman, B., Thurow, R., Williams, J. 1997. Broadscale assessment of aquatic species and habitats. An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great Basins. Volume 3, chapter 4. U.S. Forest Service, General Technical Report PNW-GTR–405.

Marmorek, D.R., C.N. Peters and I. Parnell. 1998. Plan for Analyzing and Testing Hypotheses (PATH): Final Report for Fiscal Year 1998. ESSA Technologies, Ltd. 1765 West 8th Avenue, Suite 300. Vancouver BC, V6J 5C6. 263 pp.

NRC (National Research Council). 1996. Upstream: Salmon and society in the Pacific Northwest. Washington, DC: 39–66. Chapter 3.

NMFS (National Marine Fisheries Service). 1995. Biological opinion: reinitiation of consultation on 1994–1998 operations of the Columbia River power system and juvenile transportation program in 1994–1998. Endangered Species Act, section 7 consultation. NMFS, Portland, OR.

NMFS (National Marine Fisheries Service). 2000. Conservation of Columbia Basin Fish: Draft Basin-wide Salmon Recovery Strategy (Update of the All-H Paper). Volume 2. July 27, 2000. Prepared by National Marine Fisheries Service in consultation with the Federal Caucus.

Pearcy, W.G. 1992. Ocean ecology of North Pacific salmonids. Washington Sea Grant. University of Washington.

Peters, C.N. and D.R. Marmorek (eds.) 2000. PATH Preliminary Evaluation of the Learning Opportunities and Biological Consequences of Monitoring and Experimental Management Actions. April 11, 2000. ESSA Technologies, Ltd. 1765 West 8th Avenue, Suite 300. Vancouver BC, V6J 5C6. 154 pp.

Petrosky, C.E. and H.A. Schaller. 1996. Evaluation of Productivity and survival rate trends in the freshwater spawning and rearing life stage for Snake-River spring and summer chinook. In Marmorek D.R. and 21 co-authors. 1996. Plan for Analyzing and Testing Hypotheses (PATH): final report of retrospective analysis for fiscal year 1996. ESSA Technologies Ltd., Vancouver, B.C..

Raymond, H.L. 1979. Effects of dams and impoundments on migrations of juvenile chinook salmon and steelhead from the Snake River, 1966 to 1975. Transactions of the American Fisheries Society. 108: 505–29.

Schaller, H.A., C.E. Petrosky and O.P. Langness. 1999. Contrasting patterns of productivity and survival rates for stream-type chinook salmon (Oncorynchus tshawytscha) populations of the Snake and Columbia rivers. Can. J. Fish. Aquat. Sci. 56:1031–1045.

STUFA (State and Tribal and U.S. Fisheries Agencies). 2000. A technical review of the National Marine Fisheries Service Leslie matrix model of Snake River spring and summer chinook populations. April 28, 2000. Submitted to NMFS for ESA Record.

Thurow, R. 1985. Middle Fork Salmon River fisheries investigations. Job Completion Report. Federal Aid in Fish Restoration Project F–73-R–6. Idaho Department of Fish and Game, Boise.

Thurow, R.F. 2000a. Dynamics of chinook salmon populations within Idaho's Frank Church wilderness: implications for persistence. Pages 143–151 In: McCool, S.F., Cole, D.N., Borrie, W.T., O'Loughlin, J. Wilderness science in a time of change conference-Volume 3: Wilderness as a place for scientific inquiry, May 23–27, 1999, Missoula, MT. U.S. Forest Service, Proceedings, RMRS-P–15-Vol–3.

Thurow, R.F., Lee, D.C., Rieman, B.E. 2000b. Status and distribution of chinook salmon and steelhead in the interior Columbia River basin and portions of the Klamath River basin. In: Knudsen, E., Steward, C., Mac Donald, D., Williams, J., and Resier, D., eds. Sustainable fisheries management: Pacific salmon. Boca Raton: CRC Press: 133–160.

STATEMENT OF DAN JAMES, BALL JANIK LLP, PACIFIC NORTHWEST WATERWAYS ASSOCIATION, VANCOUVER, WA

INTRODUCTION

Mr. Chairman, my name is Dan James. I am a government relations consultant with the law firm Ball Janik LLP. I am representing the Pacific Northwest Waterways Association, where I worked from January 1992 until last month. The PNWA membership includes nearly 120 organizations and individuals in Idaho, Washington and Oregon. PNWA represents public port authorities on the Columbia/Snake River System, the Pacific Coast and Puget Sound; public utility districts, investor-owned utilities, electric cooperatives and direct service industries; irrigation districts, grain growers and upriver and export elevator companies; major manufacturers in the Pacific Northwest; forest products industry manufacturers and shippers; and tug and barge operators, steamship operators, consulting engineers, and others involved in economic development throughout the Pacific Northwest. Our Idaho members include the Port of Lewiston, Boise Cascade Corporation, Potlatch Corporation, Idaho Power Company, Lewiston Grain Growers and the Lewis-Clark Terminal Association.

We appreciate the opportunity to discuss issues related to salmon recovery science in the Columbia Basin.

SUCCESSFUL "APPLIED SCIENCE"

Consider the moon landing and the frozen French fry. The polio vaccine and the cellular phone. In each instance, there were vast uncertainties in the science, wide gaps in knowledge, conflicting data, and a diversity of opinion, yet, ultimately those who pursued their goals were successful. The application of science was successful because goals were clear and priorities were definite. Senator, absent clear goals and definitive priorities, the problems surrounding the recovery of salmon continue in the Pacific Northwest. We are attempting to apply science without clear goals and without definitive priorities.

CONFLICTS IN LAW, CONFLICTS IN GOALS, CONFLICTS IN PHILOSOPHY

Conflicts in law, conflicts in goals, and conflicts in philosophy are serious impediments to salmon recovery in the Columbia Basin.

Law

• It is the responsibility of the National Marine Fisheries Service (NMFS) to protect endangered fish, without regard to the economic cost of doing so. However, it is the responsibility of the Northwest Power Planning Council (NPPC) to protect all fish and wildlife, in balance with meeting regional energy needs.

• The Migratory Bird Treaty Act and the Marine Mammal Protection Act and other laws were created to promote a healthy, balanced ecosystem. At the same time, the species we are protecting have increased their consumption of ESA-listed salmon.

• The ESA gives the highest possible policy and legal priority to the protection of listed subspecies of salmon, yet the United States has trust responsibilities and treaties regarding Native Americans' tribal fishing rights.

Goals

• There are conflicts between providing sustainable runs or harvestable runs of salmon.

• There are conflicts between protecting weakened wild salmon runs and encouraging the harvest of stronger runs of wild salmon and hatchery fish.

• There are conflicts between enhancing populations of wild fish and enhancing population of hatchery fish.

• Because we have so many goals, we essentially have no goal.

Philosophy

• Some who advocate breaching dams are not willing to consider alternatives to mixed stock harvest to save endangered salmon.

• Some who advocate massive reductions in water withdrawals that would devastate irrigated agriculture appear unwilling to consider changing hatchery management goals to protect wild salmon runs.

WE NEED TO ESTABLISH PRIORITIES

Recognizing that we have many conflicting goals, the way to successfully move forward is to establish definitive priorities—a task we have yet to accomplish. I offer these problems to illustrate my point:

• What do we do when ESA and treaty obligations conflict?

• What do we do when salmon protection and marine mammal or avian protections conflict?

• What do we do when our hatchery practices for harvest practices hurt ESA-listed fish?

To answer these questions, we need to establish priorities. So far, we have none. So far—we have seen the Federal, State and tribal agencies attempt to meet diverse and conflicting objectives—in many cases—at the expense of other national and regional goals—that appear to be regulated to second tier. The Columbia and Snake rivers support a tremendous diversity of life and bring a remarkable array of benefits to the region and the Nation. The rivers support complex ecological systems and are the lifeblood of the regional economy. The question we have posed to ourselves is this: As users of these rivers, how can we support recovery of listed salmon stocks and preserve the other benefits that these rivers bring to the entire region and the nation?

Senator, we hope that you and your colleagues will direct the Federal, State and tribal fish managers to establish clear and consistent goals that recognize the complexities of salmon and the river system and sets priorities to maximize the chances of recovery. If the outcome of that guidance manifests itself in *multiple* goals, then we must establish clear priorities that lead us to salmon recovery.

We appreciate your listening to our thoughts on these issues. Thank you.

SAVING SALMON IN THE PACIFIC NORTHWEST

SALMON RECOVERY: AN OVERVIEW

In the next few months, the people of the Pacific Northwest and our policymakers will be making critical decisions that will affect salmon and other natural resources. The region's salmon efforts have been extensive, with more than $3.0 billion invested since the passage of the Northwest Power Act in 1980. Yet, the region's rivers remain the focus of a perplexing policy and scientific debate.

Almost all of this debate is centered around proposed solutions to the salmon issue. This attempt to find "the answers" has not produced a recovery plan—mainly because the region hasn't agreed on the question.

Before the region can find specific solutions addressing salmon recovery, we believe the Northwest must address the following, broader questions:

What vision does the region have for its rivers? What goals do we have for our salmon and steelhead populations?

Despite intense debate, these questions remain largely unaddressed. Indeed, the primary lesson of the past 20 years is that the region's multi-layered process for salmon management is not effective at defining consistent goals.

Instead, conflicting goals have led to actions that in some cases reduced salmon survival. What we have learned is that proposing solutions without clearly articulated goals will not result in recovery.

Further, proposed solutions that ignore the complexity of the salmon lifecycle and the complexity of the river system will not work.

In short, the region needs a recovery plan that:

(1) establishes and follows clear and achievable goals;

(2) recognizes the complexities of salmon and the river system, and

(3) sets priorities to maximize the chances of recovery.

By insisting on a plan with these three elements, the region can restore salmon runs and—at the same time—maintain the many environmental and economic benefits of the Columbia/Snake River System. It does not have to be an either/or choice.

The following sections of this paper address each of the three elements needed for an effective recovery plan.

A PLAN THAT ESTABLISHES AND FOLLOWS CLEAR AND ACHIEVABLE GOALS

Before any salmon recovery effort can succeed—and before any specific recovery proposal can be evaluated—the region must adopt clear and attainable goals.

In the recently completed "All-H" paper, the Federal agencies describe Conservation Goals. They include: conserve species and ecosystems, ensure tribal fishing rights, balance needs of other species and minimize adverse effects on humans.

These goals mean different things to different people.

- For some, the most important goal is to recover listed salmon populations to the point where they can be removed from the Endangered Species List. That goal leads to a certain set of actions and policies.
- For some, the priority is to build strong fish runs (of both wild and hatchery salmon) to support current or even increased harvest levels. That leads to a different set of actions.
- For some, the goal is to return to a so-called "natural" river. That would lead to an even more drastic and uncertain set of actions.

Without broad support for a unified plan, groups with conflicting objectives are likely to work at cross-purposes—all under the broad banner of "saving the salmon." This situation is as much a legal, policy and fisheries management crisis as a biological crisis.

A PLAN THAT RECOGNIZES THE COMPLEXITIES OF SALMON AND THE RIVER

Salmon travel thousands of miles over their lifespan, beginning in the Columbia River and its tributaries followed by years in the ocean before returning to the river system to spawn. Along the way they are affected by dams, harvesting, predators, ocean conditions and many other variables.

Salmon mortality is a result of many factors all along the lifecycle of the salmon. This points out the overriding Catch–22 of all single-minded salmon recovery efforts: Increasing survival at a single point might be offset by mortality at another point in the salmon lifecycle.

A comprehensive approach to improving salmon survival is the only way to systematically reduce the levels of mortality that have led to the low population sizes.

Recovery efforts must address:

- spawning and rearing habitat;
- downstream migration;
- predators;
- estuary conditions;
- ocean conditions;
- upstream migration;
- hatcheries; and
- harvest.

Focusing on any one recovery measure will be unsuccessful because there is not a single source of mortality. Rather, we must work toward a coordinated, comprehensive and scientifically-based recovery plan.

A PLAN THAT SETS PRIORITIES TO MAXIMIZE THE CHANCES OF RECOVERY

There is no shortage of proposals to "save the salmon." In addition to adopting clear goals and focusing on the entire salmon lifecycle, an effective recovery plan must also prioritize these proposals. This will allow the region to invest in the plans with the best chance of success.

Science is critical to setting these priorities. Great strides have been made in our understanding of the salmon lifecycle. However, there continue to be large uncertainties that can only be answered through continued research.

Recent science has provided evidence that survival of both juvenile and adult salmon through the mainstem dams has been significantly improved as a result of the region's major investments in dam passage and operational changes.

Current NMFS research shows increased survival for spring/summer salmon in the Snake and Columbia rivers.

Survival rates at each dam, as measured by NMFS, are nearly 95 percent for most years since 1995. This compares with estimates of per project survivals for Snake River fish of less than 70 percent during most of the 1970's. (http://www.nwfsc.noaa.gov/pubs/white/travel.pdf on page 24)

Indeed, the survival level through this stretch of the river is approaching the practical upper limit. (It is not possible to reach levels of 100 percent survival even through free flowing stretches of the Snake and Columbia rivers.)

In addition, NMFS research is indicating that other factors play a more important role in salmon mortality than previously thought. These factors include estuary mortality, predation, poor ocean survival and inadequate survival during the first year of life before the salmon reach the first dam.

WHERE DO WE GO FROM HERE?—A COOPERATIVE APPROACH

The Columbia and Snake rivers support a tremendous diversity of life and bring a remarkable array of benefits to the region and the Nation. The rivers support complex ecological systems and are the lifeblood of the regional economy.

The question we have posed to ourselves is this: As users of these rivers, how can we support recovery of listed salmon stocks and preserve the other benefits that these rivers bring to the entire region and the nation?

In answer to that question, we have formulated the following four principles, which we endorse for ourselves and for others who seek to make a constructive contribution.

1. Move beyond us-versus-them solutions. Seek win-win opportunities instead.

2. Avoid drastic calls to action based on panic. Instead, seek a reasonable or proven course based on sound science.

3. Recognize that there is no "silver bullet." There is no single action that will save the salmon. "Silver bullet" solutions are not scientific solutions because they fail to recognize the complex interconnected lifecycle of the salmon.

4. Most importantly, insist on and contribute to formation of a salmon recovery plan based on the three elements we have outlined. Any effective salmon plan must:

- establish and follow clear and achievable goals,
- recognize the complexities of salmon and the river system, and
- set priorities to maximize the chances of recovery.

In the Columbia and Snake rivers, the Northwest has been entrusted with a remarkable resource—one that brings benefits to all aspects of life in the Northwest. By following these four principles, the region can restore listed salmon runs while maintaining a healthy environment and a strong economy. Ultimately, that will benefit everyone.

STATEMENT OF THAYNE BARRIE, IDAHO STEELHEAD AND SALMON UNLIMITED

Chairman Crapo, and members of the committee, My name is Thayne Barrie, I am an independent businessman, and president of Idaho Steelhead and Salmon Unlimited. I own Sunset Sports Center with stores in Boise and Pocatello, Idaho.

Idaho Steelhead and Salmon Unlimited (ISSU) was formed in 1984 by a diverse group of businessmen, guides, conservationists, sport fishermen, and concerned citizens from throughout the region to protect, restore, and preserve The Snake River's anadromous resource.

The Snake River was once one of the worlds largest producers of spring chinook, summer chinook, and steelhead, as well as large numbers of sockeye, coho, and fall chinook salmon. Snake River salmon contributed to economies as far north as Alaska, and to the south as far as California, as well as 900 miles inland to Stanley, Idaho.

Members of ISSU claim they can remember in the late 1960's and early 1970's when small communities along the Salmon River—such as Clayton, Idaho near Challis—would sell about 2000 gallons of gasoline a day to salmon fishermen . . . and about that many gallons of beer.

In 1978—only 3 years after the completion of the four lower Snake River dams—salmon fishing closed on the world famous Salmon River of Idaho, and has never re-opened. Fishing businesses from Alaska to Stanley were devastated by the completion of those four dams. Sport, tribal, and commercial fishermen were the first victims as a result of damming the lower Snake. Because those dams were so lethal to wild salmon and steelhead Congress acted immediately to protect remaining wild populations by creating the Frank Church River of No Return and the Selway-Bitterroot Wilderness areas to protect and enhance spawning and rearing for the few remaining wild runs. These two wilderness areas comprise the largest contiguous wilderness area in the lower 48 States. However this added to more victims as logging, mining, and ranching was eliminated in these areas. All because the dams kill so many fish that no other mortality can occur. The same trend continues to this day. The four lower Snake River dams continue to kill so many fish that no other human caused mortality is acceptable. Sport, tribal and commercial harvest are a mere fraction of what they were before the dams were built. Habitat such as Bear Valley Creek, Marsh Creek, and Beaver Creek along the Salmon River—to name a few—are in better shape today than they have ever been.

Yet the Federal Bi-Op wants to continue to punish the victims. It is laden with habitat, harvest and hatchery, measures. More of the same stuff that has been done in this basin for the last 20 years.

Currently steelhead fishing in Idaho is a $90 million a year industry. It employs approximately 3000 Idahoans. In rural Idaho—such as Riggins, Challis, and Orofino—it is an important natural resource. One that has far more economic importance than simply restoring them because of the Endangered Species Act. Don Reading—of Ben Johnson and Associates—estimates that a restored salmon fishery in Idaho would double that number. I know in my own business steelhead and salmon fishing means $310,000 or 9.5 percent of my total business. When you look at a business such as mine, and we try to hit a goal of 3 percent as a total net return, the loss of this revenue would equate to three full time and two part time jobs. I cannot even speculate to the amount of non-fishing items these customers relate to—possibly it could mean the loss of my business in whole. You factor that in State wide and the effect would be enormous.

Sport fishing in Idaho, Oregon, and Washington according to a study by the American Sport Fishing Association showed that $2,993,298,116 was spent in 1996 by sport fishermen. Nearly $3 billion in 1 year, or about the same amount that has been squandered in the region by the Northwest Power Planning Council on salmon recovery. Bear in mind this figure does not represent tribal or commercial fisheries and was compiled at a time when salmon and steelhead runs were at all time lows. Saving salmon is not a cost it is a benefit.

ISSU has no agenda to breach dams. ISSU has an agenda to save salmon even if it means breaching the four Lower Snake River dams. We are willing to support any plan that can pass State, tribal, and legal muster to restore our salmon and steelhead resources. We have yet to see one that does not involve breaching the four Lower Snake dams, nor do we believe we ever will.

I have included some economic attachments prepared by the Save our Wild Salmon Coalition. The figures in these documents were derived directly from the Army Corps of Engineers Drawdown Economic Work Group (DREW) documents.

You will see there are many more economic benefits from dam bypass. One is a $123 million recreation benefit in the 140-mile section of restored natural river in the lower Snake. A natural river in the Lower Snake River would reveal 34,000 acres of inundated riparian land and approximately 13,000 acres of river surface area, increasing big-mass in the Lower Snake by 70 percent. Another is the savings of what the Bureau of Reclamation estimates to be $180 million a year in flow augmentation, adding water to the dammed river from upstream reservoirs, disrupting hundreds of thousands of acres of irrigated land. Compliance with the Clean water Act could cost $460 million or more if the dams stay in place. I urge you to look these documents over closely. I think you will find that salmon recovery, and dam removal is a winning proposition for all of us.

Thank you Chairman Crapo for allowing Idaho's sportsman and related businesses an opportunity to be here today. I will try and answer any questions you or the committee may have.

STATEMENT OF CRAIG SMITH, RESOURCE ADVISER TO THE NORTHWEST FOOD PROCESSORS ASSOCIATION

Mr. Chairman and members of the subcommittee, thank you for this opportunity to testify today on the draft biological opinion and the operation of the Federal Columbia River Power System.

Senator Crapo, on behalf of the food processing industry in the Northwest, I would like to take this opportunity to thank you for your continued leadership on this issue which is of such great importance to all residents of the Northwest.

The Northwest Food Processors Association is a regional trade association representing the fruit, vegetable and specialty food processing industry in Idaho, Washington and Oregon. Food processing is the largest manufacturing employment sector in the State of Idaho and the second largest manufacturing employment sector in both Washington and Oregon. Food processors in the region operate 257 processing plants, employ 50,000 individuals and realize $7 billion in annual sales. Food processing is the backbone of the rural Northwest economy.

Food processors have a critical interest in the future of the Columbia/Snake system. It is this great system that has allowed our region to become one of the foremost food production areas in the world. Access to adequate irrigation water, the availability of dependable, low cost power and the river transportation system, which helps us reach Asian export markets, are all critical to the continued viability of our industry.

Today, it is apparent that salmon recovery in the Columbia/Snake system is at a crossroads. The draft biological opinion signals the beginning of a shift in direction for the salmon recovery debate. It is a shift away from dam breaching, toward a performance-based plan. We believe this shift is long overdue, even though the Bi-Op has many problems and still contains many of the elements of past, failed efforts.

For too long the region has argued over the "big ticket items", dam removal and flow augmentation. These two issues have been the focus of tremendous controversy and have dominated the public discussion. Now, the science is becoming more focused and the debate is shifting. We are now beginning to understand that the science doesn't support either of these strategies, especially as it relates to Snake River stocks.

That is a huge problem for some folks who have staked their reputations on breaching and flow augmentation. Consequently, we now have a rebirth of the debate over who has the "right" science. The current argument is not over Crisp vs. Flush, even though that one was never really resolved. But we still seem to be battling over who has the better black box and which model more accurately reflects reality. Should we rely on PATH or CRI? Does the data include the most recent PIT tag studies or are they ignored? Did NMFS allow for enough collaboration on CRI, or did they manipulate their results?

On it goes, seemingly forever, with no resolution in sight. While we argue, spin and debate; viable, proven and effective measures that will really help salmon continue to wait for the region to put its energy into productive recovery efforts. This is not to say that good things are not now being done, they are. But how much more could we accomplish if we really moved beyond these esoteric, self serving debates.

Mr. Chairman, our industry and the residents of the Northwest that depend on the Columbia River system for their livelihoods, have had enough of this endless debate. The uncertainty hangs like a cloud and combined with difficult times in the agricultural sector, it is having a very negative effect on our industry.

For the good of the region, it is time to develop and move ahead with a recovery plan. It is time for reason and common sense to merge with science and produce a plan that can be implemented immediately. For the benefit of the fish, for the benefit of the Northwest.

That is why we agree with the approach taken by the region's Governor's last summer. We believe that the solutions must come from the region. Using the science to inform their decisions, the region's Governors are best situated to develop a comprehensive, balanced plan that will benefit endangered fish.

NMFS and the other Federal agencies have had 10 years since the first listing on the Columbia/Snake system and they still have not produced a recovery plan. In fact, they not only don't have a plan, they don't even have a goal against which to measure progress. The performance standards in the draft Bi-Op are an attempt to set some goals for the operation of the system. However, they mean little outside the context of an overall recovery plan.

In fact, it is our belief that the performance standards, and the subsequent requirement for offsite mitigation, have the potential to significantly damage on-going habitat improvement projects by forcing dam operators to go into tributary habitat

areas and find projects which they can credit against their individual survival requirements. This process has the potential to disrupt local planning processes and to limit the willingness of local entities to cooperate in habitat improvement projects.

We are advocates of performance standards. However, they must be developed for the whole system, not just the hydra operations, and this is not possible under the current Bi-Op, since it is outside its legal scope. This further accentuates the need for a recovery plan. We have to eliminate the piece meal management practices we now follow.

Consequently, it is time to end the rancorous debate over flow augmentation from the Upper Snake River and the removal of the four Lower Snake dams. While these two issues continue to polarize the region, the science does not support either alternative. It is this fact that has some people advocating the return to older science that supports their position.

First, let me touch on flow augmentation.

Flow augmentation has failed, yet it is the primary strategy utilized by NMFS to mitigate for the effects of impoundment. The flow program is based upon a set of totally flawed assumptions. The Hydropower Appendix of the All-H paper States the following:

Flow augmentation, or use of water from storage reservoirs to augment natural streamflows, is one of the primary strategies to mitigate the effects of impoundments and the regulated hydrograph on juvenile passage.

Flow augmentation from storage reservoirs is intended to reduce the fishes' travel time to more closely approximate that of pre-dam conditions. The hypothesis is that increased water velocities resulting from higher flow rates will decrease juvenile fish travel time, resulting in reduced freshwater residence and earlier arrival at the estuary.

Flow augmentation has virtually no effect on travel time and thereby offers absolutely no benefit to spring migrants. Recent work by Karl Dreher, ID. Dept. of Water Resources, shows that adding 1 MAF annually to existing flows results in less than a 0.1 mile per hour increase in velocity through the Lower Snake reservoirs.

PIT tag data shows absolutely no correlation between flow and survival for spring/summer migrants. NMFS has finally recognized this in the draft Bi-Op. However, their response has been to shift the augmentation period to later in the summer in an attempt to benefit fall chinook migrants. Benefits to fall chinook from increases in travel time are not clear and may not exist.

In the Hydropower Appendix of the All-H paper, the following summary statement is made:

> The relationship between flow and fish travel time is somewhat weaker for summer migrants (e.g., fall chinook) than observed for spring migrants. Fall chinook have a more complex migratory behavior than spring migrants, with fish size, feeding, and rearing all affecting their migration.

NMFS science does shows a positive correlation between flow and survival for fall chinook smolt in the free flowing sections of the Lower Snake. However many experts believe this correlation is caused by other environmental factors. A new study by Anderson, Hinrichsen and Van Holmes (2000), concludes that Hells Canyon flow augmentation is *detrimental* to fall chinook due to the increase in temperature from the warmer upstream flows.

It is difficult to understand, in light of the information presented in NMFS own science discussion, why the Federal agencies continue to rely on this failed recovery measure. The agencies seem to have an irrational attachment to flow. This is again demonstrated in the totally erroneous conclusions drawn at the end of the flow augmentation discussion of the Hydropower Appendix to the All-H Paper. The conclusions stated are:

> In summary, research suggests that the spring flow objectives outlined above are reasonable. Flow augmentation does not restore historic flow conditions, but survival rates for juvenile spring/summer chinook passing eight dams approach the levels observed for fish passing four dams. This suggests that flow management coupled with other passage measures has had a positive effect on juvenile survival.

NMFS own science suggests exactly the opposite conclusion. While juvenile survival in the Lower Snake *is* at an all time high, flow augmentation has made no contribution to that survival. Now data shows that it might even be detrimental. Yet, NMFS is advocating for even greater flows from Idaho.

It is time for NMFS and the fish managers of the Northwest to stop advocating flow augmentation as a one-size-fits-all solution. More water does not necessarily mean more fish, and in some cases, such as flows during the summer from the Upper Snake, it may be extremely harmful.

The case for dam breaching is no better. This is not a battle over PATH or CRI, this issue is being driven by the hard data being collected in the PIT tag studies.

However, it seems the discussion of breaching dams causes hearts to race and science to stagger. Advocates of dam breaching have been seriously hindered by the science in the past several years. That is why we believe the controversy over the validity of the CRI analysis is becoming so pointed. CRI is not new science. It is a risk assessment model that uses most of the same data contained in PATH, along with much of the later data from the PIT tag studies.

CRI does not point to dam breaching as a "silver bullet" that will solve ail of our recovery problems. Common sense tells us that there is no silver bullet in an issue this complex. However, even last winter, prior to most of the CRI analysis being completed, NMFS science documents did not support breaching.

Dam breaching does not come close to returning enough benefit to justify the staggering cost. NMFS research shows that the benefits of dam breaching are minimal, will take many years to realize and even then the benefits are speculative. The Anadromous Fish Appendix of the Corps EIS states:

> CRI analyses suggest that no single management action is likely to result in sufficiently improved demography for spring/summer chinook salmon. For dam breaching alone to recover spring/summer chinook salmon, it would have to produce improvements in estuarine and early ocean survival as high as 80 to 100 percent, as well as an approximate 30 percent improvement in survival during upstream migration.

In fact, the CRI analysis indicates that the most effective way to help Snake River stocks is to aggressively pursue actions that improve survival in the first year of life and during their time in the estuary and entry into the ocean. The Anadromous Fish Appendix states:

> On a more optimistic note, the CRI analyses suggest that a combination of improvements spread throughout the life cycle, and attained by a mixture of different management actions, could promote adequate annual population growth for spring/summer chinook salmon. Numerical experiments that correspond to manipulations of "current demography" indicate that small improvements in estuarine and early ocean survival or in the survival of newly-born fish, will yield the greatest rewards in terms of enhanced population growth.

The theoretical benefits of dam breaching are different for fall chinook and spring/summer chinook. For fall chinook, harvest reductions or moratoriums appear to have the same benefit as dam breaching, at a fraction of the overall cost. Fall chinook would also benefit, in a breach scenario, with increased spawning habitat. However, breaching the lower four Snake dams would restore only 7 percent of the historical fall chinook habitat; 90 percent of that habitat would remain unavailable.

Benefits of dam breaching for spring/summer chinook are even more speculative. The only way to show any benefit to this stock from breaching is to manipulate the "D" value of the latent mortality calculation. This is clearly outlined in the Anadromous Fish Appendix of the Corps EIS:

> For spring/summer chinook salmon, there is no silver bullet that is likely to adequately reduce extinction risks. For dam breaching alone to recover spring/summer chinook salmon, very optimistic scenarios would need to be assumed about how much survival below Bonneville Dam could be improved due to the elimination of latent mortality not measured during in-river downstream and upstream migration.

Delayed mortality is a theoretical concept that tries to explain potential survival differences between transported and in-river fish. To justify a breach decision biologically would require the presence of significant latent mortality. The All-H paper Hydropower Appendix states:

> Before these fish return to spawn, they may suffer additional mortality that exceeds what would have occurred if they were not barged. This mortality is termed differential delayed transportation mortality (measured by the "D-value"). This is one of the most important parameters with regard to deciding upon the role of juvenile fish transportation in salmon recovery and assessing the potential benefit of dam breaching.

NMFS own data argues against latent mortality. The All-H Hydropower Appendix contains the following statements:

> Breaching the Lower Snake River may be considered if experimental management results find the level of delayed mortality associated with transported fish is significant, particularly if transported survival is less than estimated natural river survival levels.

Overall, direct survival of transported migrants is high, estimated at greater than 98 percent. Behavior and survival of transported fish following release below Bonneville Dam is similar to that of in-ever migrants. Some people believe that indirect mortality of transported fish is high (i.e., many of the fish that survived during transportation die later; delayed transportation mortality, but this is a subject of ongoing research. Some have also suggested that fish that migrate in-river and are undetected at dams return at higher rates than those that were transported. While some differences in SARs exist between transported and undetected in-river migrants, no *significant differences have been observed.* (emphasis added)

Since survival of in-river and transported migrants is "similar", and since NMFS sees "no significant difference" in the SAR's of transported and undetected in-river migrants, then there is absolutely no evidence of latent mortality. Without latent mortality, there is no biological justification for breaching the Lower Snake River dams, even without considering the enormous costs.

Additional factors argue strongly against breaching the lower four Snake River dams.

The Corps of Engineers estimates that 50–75 million cubic yards of sediment will be released into the river when the dams are breached. This majority of this sediment will be deposited in Lake Wallula. The impact of this action on resident and anadromous stocks will be long term and severe.

In December 1999, the Northwest Power Planning Council issued a report that estimates the need for 3000 MW of new electric power production by the year 2003. The four lower Snake dams produce 1,195 MW of power for the Bonneville system. Breaching these dams would increase the projected regional power deficit by 40 percent.

Breaching four dams on the Lower Snake River is not a viable option and should not be pursued.

SUMMARY

Now is the time for action, not for continued argument over the nuances of science. The science will never be complete. However, between the controversial issues of breaching and flow augmentation, there is general agreement on many practical, achievable and productive salmon recovery measures. Actions such as:

- Act immediately to limit pinniped, avian and pikeminnow predation.
- Continuing to improve mainstem passage through by-pass improvements and surface collectors.
- Continue to improve transportation methods.
- Target funding to improving critical habitat areas where opportunities exist to significantly increase smolt production.
- Limit in-river harvest to tribes and work on developing terminal fisheries.
- Adopt hatchery practices that encourage conservation.
- Research the effects of ocean conditions on specific stocks.
- Enforce the Pacific Salmon Treaty

Now is the time for the region to step up to the challenge and implement these practical measures. We believe the best place for that to happen is in a regional forum led by the four Governors. We need a recovery plan and the Federal Government needs to work with the region to develop one.

Now is the time for action on things we can agree on, not for continued argument over esoteric issues that are intended to support a biased political position.

STATEMENT OF MARK BENSON, DIRECTOR, PUBLIC AFFAIRS, POTLATCH CORPORATION

I am Mark Benson, director of public affairs for Potlatch Corporation's western region. Potlatch Corporation is a diversified forest products company with holdings in Idaho, Arkansas, Minnesota, Nevada and Oregon. It is our pulp, paper, tissue and lumber operation in Lewiston, Idaho and our 670,000-acre forestland holding in north central Idaho that makes the FCRPS draft Bi-Op and draft Basin-wide Salmon Recovery Strategy important to us. Over the past 20 years we have developed a significant market for our paperboard in Japan and other parts of the Pacific

Rim. Our ability to use barge transportation between Lewiston and Portland has been critical to our success in competing in these overseas markets.

Senator Crapo, let me begin my comments by thanking you for your support for allowing all involved to focus on actions that will help the fish while leaving dams in place, protecting Idaho's water and meeting the needs of Idaho's communities. It is gratifying as an Idaho business with significant dependence on the existing river infrastructure to know we have unanimous support from our entire Federal delegation as well as our Governor. I also wish to thank you for providing this hearing opportunity for Idahoans to voice their opinions and thoughts about the Bi-Op and Basin-wide Strategy.

As you well know, there are strongly different views of the role of the dams with respect to the current condition of Columbia and Snake River anadromous fish—both in terms of the contribution the dams make to the problem and in terms of their potential contribution to the solution.

We believe there needs to be recognition of the strengths of the Bi-Op as well as its short-comings.

Early on attention was too often focused exclusively on the dams. We think that was wrong, and we are encouraged that both the scientific and the policy focus has expanded to include the entire life cycle of the fish and all of the H's that impact their life cycle. The fundamental premise underlying the draft Bi-Op and Recovery Strategy paper is that we set aside dam breaching and aggressively pursue a range of other measures to protect and recover listed fish species.

We see no better course available for us to take. We understand that the details of the draft proposals leave many areas of uncertainty and debate, and that the process going forward will necessarily be adaptive and subject to ongoing improvement. As is often the case, the devil is in the details. We have concerns about the specifics and timeframes of the performance measures.

As the documents relate to offsite habitat management we share a strong concern with others in our industry about the growing Federal intrusion into resource management roles that historically have been, and should be, the province of State sovereignty. We share similar concerns for farming communities of our State who see their dependence on irrigation increasingly at risk of Federal intervention. We believe, therefore, that the action by our Governor in Idaho, together with the Governors of Washington, Oregon and Montana, in stepping forward to assert a strong State role in the recovery measures that must be undertaken is critical to an acceptable and successful outcome.

Potlatch Corporation and the forest products industry are dedicated to fish recovery without interruption of the river system and its amenities. We believe based on our interpretation of work done both by government and private sector scientists that this is realistic. We are committed to working together with Idahoans and others in the Pacific Northwest who are committed to finding solutions to accomplish this task.

It's important to move forward and we must move forward. In our opinion moving forward requires three things. Clear direction for maintaining the existing infrastructure, meaningful and effective measures for recovering fish and legal certainty.

Mr. Chairman, in conclusion I would like to thank you for the strong interest you have taken in addressing this hugely difficult and critical issue. We deeply need the help and guidance we have come to expect from you in our collective goal of achieving a successful outcome for all of the economic, environmental and community interests that have so much at stake in this effort.

STATEMENT OF R. SCOTT CORWIN, DIRECTOR OF REGIONAL AFFAIRS, PNGC POWER

EXECUTIVE SUMMARY

Mr. Chairman and members of the subcommittee, thank you for this opportunity to appear before you today on behalf of PNGC Power, an energy services cooperative owned by 16 Northwest rural electric cooperatives, including six from Idaho. Our comments on the draft Biological Opinion and Basinwide Salmon Recovery Strategy are summarized below.

Goals.—The Bi-Op and Recovery Strategy take significant steps forward in trying to look at species recovery in a comprehensive fashion. However, the goals in the Bi-Op and the Recovery Strategy fail to address a weakness that has continually hampered fish management in the Northwest: lack of prioritization and lack of reconciliation among conflicting goals in areas such as fish harvest and production.

Integration.—The two documents should make more aggressive strides to ensure that priorities, goals, and implementation of strategies are coordinated with the

Northwest Power Planning Council's program, the four Governors outline, and Tribal programs.

Standards.—While the inclusion of the concept of performance standards for measuring results is worthy, many of the standards are incomplete and unevenly applied. In some areas there remain questions as to whether the measures are achievable at all.

Dam Breaching.—The best new science continues to deny the value of breaching as a salmon recovery tool. We object to the inclusion in the draft Bi-Op of a vague set of triggers toward breaching dams, including requests for preliminary design work. With limited scientific or legal basis behind this drastic action, we fail to see how references to it deserve treatment alongside reasonable and prudent alternatives in this Biological Opinion.

Getting the Best Value for the Investment.—The hydro system will continue to be a major focus of recovery efforts in this Bi-Op, and will continue to fund the bulk of the mitigation in the region. But, because science, as indicated by recent NMFS Science Center studies, shows that progress has raised hydro fish passage close to the point of diminishing returns, real success for recovery will require looking into other areas of the lifecycle. Efforts in the first year of life and in the estuary appear to be very promising in this respect.

Balancing Effort and Costs.—We are concerned that we have yet to see a comprehensive budget for the Bi-Op and draft Recovery Strategy that contains commitments from the many relevant Federal agencies and regional entities. A viable plan cannot be a large blank check funded by the region's electricity customers.

Power System Reliability.—While curtailing fish and wildlife operations during power emergencies should not take the place of good resource planning, language should be included in the Bi-Op that recognizes the need to ensure human safety.

INTRODUCTION

Mr. Chairman and members of the subcommittee I appreciate this opportunity to appear before you today to discuss the National Marine Fisheries Service (NMFS) Draft 2000 Biological Opinion (Draft Bi-Op) on the Federal Columbia River Power System (FCRPS), and the Draft Basinwide Salmon Recovery Strategy. Thank you for showing the leadership to hold this hearing to scrutinize these issues. Clearly, they will have enormous impact on both the environment and the economy of our region.

I appear today on behalf of PNGC Power, an energy services cooperative owned by 16 rural electric cooperatives throughout the Northwest. Our Idaho members include Clearwater Power Company, based in Lewiston, Fall River Rural Electric Co-op, based in Ashton, Lost River Electric Co-op, based in Mackay, Northern Lights Inc., based in Sandpoint, Raft River Electric Co-op, based in Malta, and Salmon River Electric Co-op, based in Challis. We are a Northwest-based company that manages wholesale power supply and provides other technical services to our members and clients.

Our interest in the Bi-Op and other processes impacting salmon and the river system stem from two primary concerns. The first relates to maintaining the delicate balance between the environment and the agricultural economy. As electric cooperatives, our member utilities answer directly to their owner/customers. These customers have a genuine concern for the environment and enjoy our Northwest way of life. Whether they are hikers, campers, fishing enthusiasts, or hunters, they have a personal interest in responsible conservation of our natural resources. In addition, many of these customers make their living off of the land. They understand the need to protect the delicate balance that allows utilization of natural resources in a renewable manner. In fact, this understanding, and the desire of cooperative customers to create new environmentally-friendly power sources, led our members to develop a landfill methane gas plant outside of Corvallis, Oregon that provides an innovative source of renewable energy.

The second primary concern these customers have is that degradation of our low-cost hydra resources will increase power rates and decrease the reliability of the West Coast power system.

Before commenting on the Bi-Op and the Recovery Strategy, I would like to highlight two important salmon management positions that will need to be filled in the next few months. From the perspective of the energy industry, the positions of Regional Director of the National Marine Fisheries Service (NMFS) and Administrator of the Bonneville Power Administration (BPA) play critical roles in the creation of balanced approaches on fish and wildlife issues. We would encourage you and your Senate and House colleagues from the Northwest to become involved very early as

potential replacements are considered for these positions. Their importance to the region cannot be overstated.

Goals, Integration, and Standards

Goals.—Viewed together, the Bi-Op and Basinwide Salmon Recovery Strategy ("Recovery Strategy") make significant steps forward in trying to look at species recovery in a more comprehensive fashion than previously attempted. The Recovery Strategy even sets out general goals for the region, an important step toward coordinating recovery efforts among the many regional entities.

However, the goals apparent in the Bi-Op and the Recovery Strategy fail to address a weakness that has continually hampered fish management in the Northwest: lack of prioritization and lack of reconciliation among conflicting goals. For example, it is not clear whether the region should be managing to optimize protected fish or whether it is attempting to optimize catchable, "hatchery origin" fish. Indeed, some have suggested that trying to manage for two types of fish may not be possible in the final analysis. This dilemma may loom large next spring with huge fish returns expected.

Senator Crapo's statement from the hearing this subcommittee held on September 13th of this year posed the question: "what sense does it make to have a policy where we spill fish over dams then club them to death when they come back?" This hits the nail right on the head. One might add to this quandary the fact that we have spent large amounts of money at each of these steps, including creation of the hatchery fish in the first place. This begs for a clarification of the true goals, or a rethinking of the puzzling manner in which the government has chosen to define the particular stocks they wish to protect.

Need for Integration and Coordination.—The policy conflicts surrounding harvest and hatchery management create a good example of the need for increased integration and coordination of the region's fish and wildlife policies. Currently, there are nine Federal agencies and numerous State and local agencies actively involved in issues relating to salmon recovery in the Northwest. Even within NMFS itself there are dual roles associated with managing fish for harvest and protecting them for purposes of the ESA. To give you an idea of the growth of the salmon recovery industry, the directory of the fish and wildlife community created by the Columbia Basin Fish and Wildlife Authority contains around 1800 names from dozens of Federal agencies, State agencies, tribal agencies, regional entities, educational institutions, industry groups, and advocacy groups.

Integrating the myriad efforts underway in the region will be absolutely critical not only to ensure progress in species recovery, but also to attempt more efficient use of resources. Coordination on the funding, administration, and implementation of a recovery plan is absolutely crucial.

Those managing the Bi-Op should more aggressively seek to coordinate on goals, priorities, and timing not only with the Northwest Power Planning Council as it recreates it's own fish and wildlife program, but also with the four Governors who have outlined their priorities in a document released last summer, and with the Columbia River Basin Tribes.

Standards and Measures.—Once goals are established and integrated, one of the ways to create accountability is with specific and measurable performance standards. The Bi-Op and Recovery Strategy have some work to do in this respect. While we appreciate that they seem to embrace the concept of performance standards, the standards appear at times vague and unevenly applied.

If the intention is to develop the performance measures as time moves on, it will be important that they balance the need for flexibility (as further scientific and programmatic information is received) with the need to set targets that action agencies can rely on as they create their 1- and 5-year plans. This will not be easy.

Indeed, there are at least two concerns with these performance measures clearly evident from the start. One is that there does not seem to be any clear way to measure real performance in the hatchery and habitat areas, a problem compounded by conflicts in goals as discussed above. This is worrisome to ratepayers who will be asked to fund some of the efforts in these areas.

The second concern is that, as the performance measures develop, it is difficult to know whether standards set for the hydro system will be achievable at all by the 5- and 8-year check-in times. It will be difficult to create regional agreement on this plan if these measures are impossible to meet. For example, the draft Bi-Op at 1.3.1.2.3 floats the concept of "Full Mitigation", a standard intended to reflect the level of fish survival that would have occurred had the dams never been built. Obviously, this raises serious questions about how such a theoretical set of measurements could be created with accuracy, and whether legal authority exists for de-

manding a standard that goes well beyond prospective "agency actions" and into reviewing the very existence of a facility.

Breaching Dams.—The triggers toward breaching the dams on the lower Snake River found in the draft Bi-Op at 9.1.8 and the call for funding to begin the process to breach dams found at 9.6.1.9 are problematic. For instance:

- It is acknowledged today that breaching dams alone will not recover the lower Snake runs. We have no reason to expect it would work 5 years from now. Further, breaching will not assist the other 8 listed salmonid runs in the Columbia River System.
- If the lack of clear unified management goals among Federal, State, and tribal fish managers makes improvements in other Hs difficult by the 5 or 8 years check-in point, the hydro system would be penalized for their failures.
- The false hope of a silver bullet of breaching dams will be furthered even if passage through the hydro system continues to improve because targets might not be met through failures in harvest/hatchery policies, bad ocean conditions, or a host of other factors. Evidence of oceanic impacts is clear in studies by David Welch, Bruce Finney and others, and should be Pursued further.
- In light of the newest and best available science, the logical and legal basis for a default to breaching dams is severely lacking. As discussed below, passage through the hydro system has improved almost to the point of diminishing returns.
- Regardless of one's view of the science, a promise to move toward breaching dams in the future will not assist fish recovery in the present or during the time period of the Biological Opinion.
- Certainly, because of the points raised above, preliminary engineering and design studies to breach dams are not warranted at this time.

ACCOUNTABILITY

This hearing is focusing primarily on scientific issues with the Bi-Op. But, these are closely tied to management and accountability issues. For example, there is much debate about whether causal relationships exist with respect to salmon survival and flow augmentation. We are skeptical about the existence of this relationship, and would highlight the valid questions relating to turbidity, velocity, temperature, flow rates, and release of hatchery fish raised in a study released September 2000 by Karl Dreher of the Idaho Department of Water Resources. Likewise, there is fervent debate over nascent theories about relationships between hydro projects and mortality occurring later in the life of salmonids. By contrast, there is not much debate about the lack of a causal relationship between money expended on this issue and recovery of protected species. Each of these issues begs for more accountability.

Getting the Best Value on Investments.—Highlighting the amount spent on fish and wildlife does not imply that all of these funds have been wasted. Progress has occurred in specific areas. But, the lifecycle of salmonids being complex and geographically diverse, progress in one arena does not necessarily lead to progress overall.

This seems to be a theme echoed in the newest science to come from the NMFS Science Center in Seattle. This makes logical sense. Science shows that progress has been made in the hydro system that has raised survival close to the point of diminishing returns. Yet, some stocks continue to suffer. Real success in recovery will require looking into other areas.

According to NMFS White Papers relying on PIT (Passive Integrated Transponder) tag data, survival of Snake River spring/summer chinook through the hydro system have increased from the 30 percent range to around 60 percent. This is about the level of survival before the four Lower Snake dams were in place.

"Attachment A" contains an Oregonian newspaper editorial from last Saturday about the NMFS paper published in the November 3, 2000 issue of Science Magazine. In this paper, well-respected scientists Kareiva, Marvier, and McClure note that "dam passage improvements have dramatically mitigated direct mortality associated with dams." They go on to say that even if main stem survival were 100 percent, Snake River spring/summer Chinook salmon would continue to decline. They note that declines could be reversed with improvements in first-year survival or estuarine survival.

Large losses are natural within the first year of salmonid life. However, when one compares survival through the hydro system of 40–60 percent with survival in the egg-to-smolt period of 3–4 percent, it is easy to see how the first couple of years of life may provide broad possibilities for efforts in the habitat and hatchery arenas.

These findings by Kareiva et. al. should not surprise anyone. Other papers in recent years have indicated that this analysis was forthcoming, and the NMFS

Science Center has held workshops in order to brief the public on their progress in this area. It is evident that there is a lot of bang for the buck to be found by looking at measures focusing outside of the hydra system. This effort should also include reevaluating some of the assumptions surrounding presumed benefits of the very expensive spill and flow regimes currently used.

Hydro Still on the Hook.—The improvements in fish passage referenced above came about because the FCRPS has undergone significant changes to improve fish survival during the last decade. Now, within flood control and safety requirements, the system is operated to maximize fish passage. Hundreds of millions of dollars have been invested in intake screens, surface by-pass systems, fish friendly turbines, transportation, gas abatement measures, and spill programs.

Northwest ratepayers are currently paying over $400 million per year for fish and wildlife efforts. As explained above, this amount may increase in this draft Bi-Op by another $100 million or more depending on market prices. Fish and wildlife expenditures currently comprise a whopping 20 percent of the BPA costs, a percentage that will increase in the rate period starting next year. For rural systems where distribution costs typically account for half of the retail rate, this means a full 10 percent of customer fills go toward fish and wildlife mitigation.

We've heard the view expressed that the hydro system is somehow let off of the hook in this Bi-Op because the Bi-Op does not immediately call for drastic actions such as breaching dams. This is not how we read this Bi-Op and Recovery Strategy.

The draft Bi-Op calls for increased effort in the river system including: continued and possibly enhanced flow augmentation; possible enhancement of spilling water for fish; and, enormous infrastructure investments in items such as spill deflectors and bypass systems. BPA estimates that the draft Bi-Op will demand at least another 70aMW of lost power generation added to the amount lost through previous Bi-Ops. This creates a total loss to the Federal system of 991aMW, or about the amount of energy it takes to provide electricity to a city the size of Seattle for a year. The cost of that lost energy depends on the market rates for power during the year. In addition, we have seen proposals for close to $50 million of additional ratepayer costs for BPA's direct Fish and Wildlife program, and another $40–50 million for increases in capital costs and reimbursements to other agencies.

During a short period in August, with prices for power skyrocketing, BPA lost approximately $40 million to fish operations. This begs two questions: First, do these spill operations always help fish? In the last spill agreement reached among river managers, spill was reduced at The Dalles Dam because studies there showed that the higher rate of spill was harming fish. The Bi-Op and Recovery Strategy should not automatically assume benefits from spill, and should promote continued study and reconsideration of this practice.

Second, should there be a cost/benefit decisionmaking process associated with these operations. If spilling water is going to cost $40 million of ratepayer funds in the span of a few days, the potential benefit of that operation should be weighed against other assistance for fish that might be purchased with that large sum of money. What benefits to fish or to the regional economy are lost in these scenarios? A regional salmon recovery strategy should consider these cost/benefit questions.

Balancing the Cost.—The draft Bi-Op also calls for a balancing of the effort into other areas in order to respond to what the science is telling us about the progress in hydra system passage to date, and about the potential for gains in other areas of the salmon lifecycle. We suspect that BPA ratepayers will be asked to fund a significant portion of those non-hydro efforts. However, ratepayer funding cannot be the exclusive source of Endangered Species Act (ESA) funding for the region. In fact, the Northwest Power Act does not permit BPA funds to be used "in lieu" of fund responsibilities of other entities.

We are concerned because we have yet to see a comprehensive budget for the Bi-Op and draft Recovery Strategy. While we suspect that ratepayers will be asked to pick up a large portion of the tab, we have yet to see budget commitments from other Federal agencies or regional entities. The Endangered Species Act is a national law with national implications. Salmon and steelhead listed under this act are species that are impacted by myriad factors well beyond the reach of the hydro system. This effort should call for specific budgets and extensive funding commitments from the various Federal agencies, especially the U.S. Fish and Wildlife Service, the Army Corps of Engineers, the Bureau of Reclamation, the Forest Service, and the National Marine Fisheries Service. To be viable, this plan cannot become a very large blank check funded on the backs of the homeowners, farmers, and ranchers who are contractually obligated to buy power from the FCRPS over the next 10 years.

POWER SYSTEM RELIABILITY AND THE DRAFT BI-OP

The Northwest Power Act States that the Northwest Power Planning Council should create a program to mitigate for impacts to fish and wildlife while assuring the Pacific Northwest an adequate, efficient, economical and reliable power supply.

Operation of the hydra system for fish is inextricably tied to reliability of the West Coast power system. This is especially true when power supply is short. As alluded to above, power costs skyrocketed to as high as $700 MWh this summer when supply was short. And, there is good reason to be concerned about potential power supplies this winter and next summer.

Ironically, in the same issue of Science Magazine in which Dr. Kareiva's article appeared on November 3, 2000 there was an article entitled "Decreasing Reliability of Energy" by editor Philip Abelson. This article notes the greatly increasing demand for electrical power in the United States, potentially rising from 40 percent of all power usage now to 70 percent by 2050. Demand is expected to grow by 20 percent in the next decade alone, while planned growth of the transmission system is only expected to be around 3.5 percent.

At the same time that demand for power is increasing, there is continued movement to discourage use of fossil fuels. Last week, President Clinton called for Federal regulations limiting power plant emissions of carbon dioxide. This forces some very difficult questions about how we will prioritize our sources of power in the future.

In our region, the Northwest Power Planning Council has estimated that we will have a one in four chance of not getting through the winter without a supply interruption over the next few years. This is five times worse than the normally accepted standard. In order to bring our region up to standard, it would require almost 3,000 megawatts of new generating resources by 2003.

To address the potential for trouble with power supply in relation to the salmon recovery effort, the Northwest Power Planning Council has requested that language be included in the Bi-Op to address several concerns. We concur with their request to include the following:

• In emergency situations, fish and wildlife operations can be curtailed. (This is simply a no-nonsense issue relating to human safety concerns).

• The option of curtailing fish and wildlife operations during emergencies should not be used in lieu of establishing an adequate and reliable power system. (Certainly, power supply concerns in the Northwest go far beyond operations for fish and should be planned for as such).

• The option of curtailing fish and wildlife operations should be viewed as a last-resort action. An emergency protocol should be developed that incorporates not only curtailment of fish and wildlife operations but also whatever other actions could be helpful to alleviate the situation.

• Proposed new resources (whether generating or demand-side) that integrate more effectively with fish and wildlife operations should be given priority.

CONCLUSION

This subcommittee knows well that the Endangered Species Act cannot be implemented in a vacuum. Because it coexists with many other laws and priorities, reasonable and balanced solutions are needed to meet it's mandates. The draft Bi-Op and Salmon Recovery Strategy take some important first steps toward creating a balanced scientifically based recovery plan. But, there is a lot of room for clarification and improvement.

Success in this challenge will be extremely difficult unless increased efficiency of effort can be achieved, including accountability not only for results across all Hs but also for each dollar spent. Without clearer goals and better accountability we will succeed only in continuing to create the sense of crisis that ensures increased expenditures without real results to show for our effort.

It is our hope that your interest in this issue, including your continued demand for the best scientific knowledge possible, will help lead the region to a coordinated approach to real recovery of these precious species. Again, thank you for your efforts, and thank you for this opportunity to testify today.

[The Oregonian, Saturday, November 18, 2000]

SCIENCE SHIFTING ON DAM REMOVALS

PEER-REVIEWED ARTICLE IN JOURNAL SCIENCE MAKES STRONG CASE THAT BREACHING DAMS IS NOT BEST WAY TO SAVE SALMON

No matter who winds up winning the White House, it's quite clear that neither the next president nor Congress will recommend breaching four dams on the lower Snake River anytime soon.

Those who have campaigned so vigorously to remove the Snake dams no doubt will be disappointed, and may charge that a decision to leave the dams intact is politically motivated.

But the truth is dam-breachers are losing the fight on scientific grounds.

Recently, the Federal Government's top salmon researchers, in an article published in the respected journal Science, an arm of the American Association for the Advancement of Science, concluded that breaching dams probably isn't an effective way to save salmon from extinction.

The article by Peter Kareiva, Michelle McClure and Michelle Marvier of the National Marine Fisheries Service lays out a solid case for leaving the dams. It argues that increasing salmon survival in the early life stages before the smolt reach the four dams—and later in the Columbia estuary, below all eight dams in the Snake River salmon's path—would have the greatest impact.

Under some of article's assumptions, the improvements in survival from removing dams would be too little to save Snake River spring/summer chinook. The article drives this point home by saying. "Remarkably, even if every juvenile fish that migrated downstream survived to the mouth of the Columbia," the salmon would continue to decline.

Put another way, breaching the four Snake River dams isn't likely to benefit the Snake River-bound fish as much as earlier scientific opinions suggest.

The fisheries service's monitoring studies, in which salmon are collected and tagged before they make the trip to the sea, not only give us information about where fish go, they also tell us a lot more about where and how they die.

As a result, some of the salmon deaths that have been blamed on the dams—speculative estimates that have tilted computer models in favor of dam breaching—are probably caused by other factors, such as predation and declining habitat for rearing salmon.

The Science article adds credibility to the fisheries service's findings. The agency is expected to complete its policy paper next month, likely recommending that the region forego dam breaching for now and take other actions to help salmon.

Those actions include restoring the rivers and streams where salmon spawn, restoring the Columbia River estuary where young salmon feed and grow before heading out to sea, reducing harvest, improving fish passage around the dams and overhauling antiquated hatchery practices.

As we learn more about what happens to the salmon in their various fresh water stages, the science is tilting away from dam breaching. Perhaps we don't know enough yet to take dam removal off the table, but the current is running against it.

STATEMENT OF SAVE OUR WILD SALMON, SEATTLE, WA

COST COMPARISON FOR THE REMOVAL OR RETENTION OF THE FOUR LOWER SNAKE DAMS

The Army Corps of Engineers Draft Environmental Impact Study (DEIS) claims that with all costs tallied, partial removal of four Lower Snake River dams would cost $246 million more each year than other alternatives. In fact, the DEIS underestimates both the benefits of dam bypass and the costs of keeping the dams in place. A comprehensive look at all costs and benefits, considering habitat and hatchery costs as well as others the DEIS omits, such as flow augmentation and Clean Water Act compliance, suggests that dam bypass saves at least $50 million annually and would contribute nearly $500 million a year in additional real benefit value.

The costs and benefits listed below are conservative. In several cases, the cost of retaining dams is likely larger. The Clean Water Act estimate below does not account for compliance with temperature standards. An alternate flow augmentation cost estimated by the Bureau of Reclamation is hundreds of millions more per year. And the costs still do not account for the Snake River's share of Federal fish mitigation spending, estimated by Taxpayers for Common Sense at approximately $100 million per year. Also, the benefits of removing dams are likely far larger than esti-

mated by the DEIS. Based on the middle estimate of recreation benefits, the recreation value of dam bypass would be at least $199–342 million per year. The passive or existence values of the salmon were calculated by the Army Corps but were not added into the Corps' summary documents. Using just the figures calculated by the Corps, but correcting adding the costs of dam retention and the benefits of dam removal, the savings from dam removal would run close to $500 million per year.

Throughout the DEIS the Corps minimizes the benefits of dam removal. The fact that the Corps accounts for $20 million a year under Mitigation for maintaining Habitat Management Units (HMU) is absurd. HMU's are riparian lands that were established to compensate for the portions along the river that were flooded when the dams were built. Over 34,000 acres of riparian land will be uncovered after dam removal. The Corps does not include the value of this "new" land to be a benefit.

Furthermore the costs of dam removal could be reduced significantly with prudent investments in infrastructure in areas like power generation and transportation. The Corps has not studied these types of investments even though the Federal Government thinks it necessary to do so. Still, the Corps numbers (summarized below) give us a basic understanding of the economic reasonableness of dam removal.

Stay	Benefits if Dams are Removed	Benefits if Dams Stay
Recreation	$123 million Low estimate of rec. benefits if dams were removed. (DEIS I3–54). Estimation of reservoir angling and reservoir general recreation. (DEIS I3–54).	$32 million
Passive or Existence Values*		$420 million per year
	-0-.	

*Calculated and published in DEIS documents but not included in final report calculations (I–ES 17).

	Costs if Dams are Removed	Cost if Dams Stay
Dam Construction/Deconstruction	$64 million Partial removal of four Lower Snake Dams (DEIS I3–157) "Major System Improvements" (DEIS I3–157).	$21.3 million
Dam Operation, Maintenance & Rehabilitation.	$0 Avoided Costs. (DEIS I3–159).. Alt. power generation replacement, e.g. gas turbines.	$29 million
Transportation	$24 million Increased transportation costs for rail or truck/barge. (DEIS, I12–2). Reduced significantly w/infrastructure investments. See AR study by Dickey.. Conservative estimate of barging taxpayer subsidy (Grain Transportation After Partial Removal of the Lower Snake River Dams, Dr. Edward Dickey. Sept., 1999).	$10 million
Irrigation	$15.4 million Primarily Ice Harbor irrigation infrastructure (DEIS I12–2).	$0
Flow Augmentation	$0	$182 million An additional 1.0 million acre-feet studied by Bureau of Reclamation. Cost includes acquisition of flow, effect on upriver recreation, annual loss in farming gross revenues, and decrease in value of production. (Bureau of Rec. Flow Aug. Impact Analysis. February 1999.)

	Costs if Dams are Removed	Cost if Dams Stay
Mitigation	$26 million Fish and wildlife, cultural. (DEIS, I13–2).	$0
Clean Water Act	$0	$30 million Total cost $460 million, divided along the same 15-year timeline used in the All-H habitat estimates. (Resolving Rate Case Issues. Federal Memo, May 11, 1999.)
Habitat	$159 million The cost of a reduced habitat program implemented if the dams are removed. (NMFS All-H Habitat Appendix, January 2000). An aggressive habitat program.. Does not include flow augmentation. (NMFS All-H Habitat Appendix, January 2000).	$241 million
Hatchery Improvements	$7.4 million (Resolving Rate Case Issues. Federal Memo, May 11, 1999).	$12.4 million
Total cost	$444 million/year	$494 million/year
Reduction in Irrigated Lands*	(1,579)	0
Reductions in Corps' Dam Operations	(1,326)	0
Reduced Cruise Ship Operations	(83) 0	
Total Long-term Employment Loss	(2,988)	(2,382)
Net Long-term Employment Change	(711)	(1,257)
Net Change as a percent of 1995 Employment	(0.22)	(0.02)

*The vast majority of these jobs are seasonal, part-time. (Source: DEIS table 5.13–2)

The Corps of Engineers estimates of economic impact are unrealistic in two other important ways. First, they downplay or ignore economic benefits outside their 25-county study area, ignoring economic benefits to tribes, to coastal communities, and the economic growth that follows restoration of a more healthy ecosystem. Second, large costs and economic disruptions of keeping dams in place are not counted in the Corps study.

A comprehensive look at all costs and benefits, considering habitat and hatchery costs as well as others the DEIS omits, such as flow augmentation and Clean Water Act compliance, suggests that dam bypass saves at least $50 million annually. The Bureau of Reclamation has estimated that flow augmentation, adding water to the dammed river from upstream reservoirs, could cost at least $182 million a year, disrupting hundreds of thousands of acres of irrigated land, where dam removal would affect no more than 37,000 acres. Compliance with the Clean Water Act could cost $460 million or more if dams stay in place. And the cost of Tribal Treaty claims if fish go extinct, estimated in billions of dollars, would dwarf all other costs. The Corps ignores these costs.

Although some habitat restoration would be necessary if dams are removed, the Corps did not give any value to restoring 140 miles of the mainstem Snake, which would reveal 34,000 acres of inundated riparian land and approximately 13,000 acres of river surface area, increasing bio-mass in the lower Snake by 70 percent. The NW Power Planning council analyzed alternatives that include aggressive, widespread habitat actions that would be necessary if dams remain in place. The NPPC Framework Human Effects Group found the habitat-reliant alternative would cost $40 million more than dam removal, and would broadly impact farming, grazing, logging and other land uses.

Removal of four lower Snake River dams would create significant economic opportunities for construction trades, while implementing the only salmon recovery solution that scientifically promises salmon recovery. Alternatives that keep dams in place present few benefits for carpenters, are more expensive for the public and more economically disruptive to the region, and have little or no evidence that they will lead to salmon recovery.

The Corps of Engineers Draft Environmental Impact Statement (DEIS) calculates the job gains and losses that would occur if the four lower Snake dams are removed. By focusing on a 25-county "study area" surrounding the lower Snake River, the DEIS generally under-estimates economic benefits and over-estimates job losses and economic costs associated with dam removal. It fails to capture the general economic benefit of a healthy river and salmon recovery. The DEIS estimates more than 20,000 jobs would be created in the 10 years during which partial dam removal would proceed, including:

- 12,000 construction jobs building up to six replacement power plants and electric transmission lines
- 3,000 jobs building improved rail and road infrastructure
- 1175 jobs modifying wells

Job Impacts During 10 Years of Partial Dam Removal

	Lower Snake River Study Area	Regional
Power Plant Construction	5,572	2,786
Transmission Line Construction	2,080	0
Rail Construction	872	0
Road Construction	1,972	0
Facilities Construction	6,982	0
Railcar Storage Construction	0	63
Well Modification	1,175	0
Pump Modification	844	0
Partial Removal Implementation	1,293	0
Total Change	20,790	2,849
Change as percent of 1995 Employment	6.52	0.05

(Source: DEIS table 5.13–2)

Beyond the 10-year construction period, the DEIS estimates a small net loss in regional jobs, but includes gains in areas that could affect construction trades. The estimates exaggerate the impacts of reduced irrigated agriculture, ignoring approaches that could keep land in production and counting seasonal part-time jobs at the same level as full-time jobs. The DEIS also under-estimates the value of increased recreation that would follow restoration of 140 miles of free-flowing river. And a study by the Natural Resources Defense Council predicts that costs associated with increased electric bills could be reduced substantially by conservation.

Long-Term Job Impacts

	Lower Snake River Study Area	Regional
O&M Spending on Replacement Power Plants & New Transmission Lines	884	876
Increased Recreation (inc. Angling)	1,393	0
Commercial Fishing		249
Total Long-term Employment Gain	2,277	1,125
Reduced Spending due to Increased Electric Bills	(2,382).	
Power	$271 million Alt. power generation replacement, e.g., gas turbines.	$0
Transportation	$24 million Increased transportation costs for rail or truck/barge. (DEIS, I12–2). Reduced significantly w/infrastructure investments. See AR study by Dickey. Conservative estimate of barging taxpayer subsidy (Grain Transportation After Partial Removal of the Lower Snake River Dams, Dr. Edward Dickey. Sept. 1999.).	$10 million
Irrigation	$15.4 million	$0

Long-Term Job Impacts—Continued

	Lower Snake River Study Area	Regional
	Primarily Ice Harbor irrigation infrastructure (DEIS I12–2).	
Flow Augmentation	$0	$182 million An additional 1.0 million acre-feet studied by Bureau of Reclamation. Cost includes acquisition of flow, effect on upriver recreation, annual loss in farming gross revenues, and decrease in value of production. (Bureau of Rec. Flow Aug Impact Analysis. February 1999.)
Mitigation	$26 million Fish and wildlife, cultural. (DEIS, I13–2).	$0
Clean Water Act	$0	$30 million Total cost $460 million divided along the same 15-year timeline used in the All-H habitat estimates. (Resolving Rate Case Issues. Federal Memo, May 11, 1999.)
Habitat	$159 million The cost of a reduced habitat program implemented if the dams are removed. (NMFS All-H Habitat Appendix, January 2000). An aggressive habitat program. Does not include flow augmentation. (NMFS All-H Habitat Appendix, January 2000).	$241 million
Hatchery Improvements	$7.4 million (Resolving Rate Case Issues. Federal Memo, May 11, 1999).	$12.4 million
Total cost	$444 million/year	$494 million/year

JOBS AND EMPLOYMENT

Removal of four lower Snake River dams would create significant economic opportunities for construction trades, while implementing the only salmon recovery solution that scientifically promises salmon recovery. Alternatives that keep dams in place present few benefits for carpenters, are more expensive for the public and more economically disruptive to the region, and have little or no evidence that they will lead to salmon recovery.

The DEIS calculates the job gains and losses that would occur if the four lower Snake dams are removed. By focusing on a 25-county "study area" surrounding the lower Snake River, the DEIS generally under-estimates economic benefits and over-estimates job losses and economic costs associated with dam removal. It fails to capture the general economic benefit of a healthy river and salmon recovery. The DEIS estimates more than 20,000 jobs would be created in the 10 years during which partial dam removal would proceed, including:

- 12,000 construction jobs building up to six replacement power plants and electric transmission lines.
- 3,000 jobs building improved rail and road infrastructure.
- 1,175 jobs modifying wells.

Job Impacts During 10 Years of Partial Dam Removal

	Lower Snake River Study Area	Regional
Power Plant Construction	5,572	2,786
Transmission Line Construction	2,080	0
Rail Construction	872	0
Road Construction	1,972	0
Facilities Construction	6,982	0
Railcar Storage Construction	0	63
Well Modification	1,175	0
Pump Modification	844	0
Partial Removal Implementation	1,293	0
Total Change	20,790	2,849
Change as percent of 1995 Employment	6.52	0.05

(Source: DEIS table 5.13–2)

Beyond the 10-year construction period, the DEIS estimates a small net loss in regional jobs, but includes gains in areas that could affect construction trades. The estimates exaggerate the impacts of reduced irrigated agriculture, ignoring approaches that could keep land in production and counting seasonal part-time jobs at the same level as full-time jobs. The DEIS also under-estimates the value of increased recreation that would follow restoration of 140 miles of free-flowing river. And a study by the Natural Resources Defense Council predicts that costs associated with increased electric bills could be reduced substantially by conservation.

Long-Term Job Impacts

	Lower Snake River Study Area	Regional
O&M Spending on Replacement Power		
Plants & New Transmission Lines	884	876
Increased Recreation (inc. Angling)	1,393	0
Commercial Fishing		249
Total Long-term Employment Gain	2,277	1,125
Reduced Spending Due to Increased		
Electric Bills	(2,382)	
Reduction in Irrigated Lands*	(1,579)	0
Reductions in Corps' Dam Operations	(1,326)	0
Reduced Cruise Ship Operations	(83)	0
Total Long-term Employment Loss	(2,988)	(2,382)
Net Long-term Employment Change	(711)	(1,257)
Net Change as a percent of 1995 Employment	(0.22)	(0.02)

*The vast majority of these jobs are seasonal, part-time.
(Source: DEIS table 5.13–2)

The Corps of Engineers estimates of economic impact are unrealistic in two other important ways. First, they downplay or ignore economic benefits outside their 25-county study area, ignoring economic benefits to tribes, to coastal communities, and the economic growth that follows restoration of a healthier ecosystem. Second, large costs and economic disruptions of maintaining the dams are not counted in the Corps study.

Compliance with the Clean Water Act could cost $460 million or more if dams stay in place. And the cost of Tribal Treaty claims if fish go extinct, estimated in billions of dollars, would dwarf all other costs. The Corps ignores these costs.

Although some habitat restoration would be necessary if dams are removed, the Corps did not give any value to restoring 140 miles of the mainstem Snake, which would reveal 34,000 acres of inundated riparian land and approximately 13,000 acres of river surface area, increasing bio-mass in the lower Snake by 70 percent. The NW Power Planning council analyzed alternatives that include aggressive, widespread habitat actions that would be necessary if dams remain in place. The NPPC Framework Human Effects Group found the habitat-reliant alternative would

cost $40 million more than dam removal, and would broadly impact farming, grazing, logging and other land uses.

STATEMENT OF MATT EAMES, SENIOR LEGISLATIVE AFFAIRS REPRESENTATIVE, IDAHO POWER COMPANY

The Idaho Power Company (IPC) appreciates this opportunity to provide written comment in response to Senator Mike Crapo's November 20, 2000 public hearing in Boise, Idaho on the draft biological opinion on the Federal Columbia River Power System (FCRPS BO) and the draft basin-wide salmon recovery strategy issued by the Federal Caucus (commonly known as the final draft "All-H paper"). These comments must be put in context with the background of the Company's facilities, their physical location within the Snake River Basin, and the Company's current involvement with the dynamic set of processes unfolding in the region with respect to the fishery resources.

IPC is an investor-owned utility formed in 1915. On October 1, 1998, IPC adopted a holding company structure with the formation of IDACORP, Inc. which serves as the parent company of IPC. IPC owns and operates 16 hydroelectric plants on the Snake River and its tributaries that are licensed by the Federal Energy Regulatory Commission (FERC). It also holds an interest in three coal-fired generating stations. IPC provides electric service to approximately 380,000 customers within a 20,000 square-mile service area covering portions of southern Idaho, eastern Oregon and northern Nevada.

The largest hydroelectric facility on the IPC system is the Hells Canyon Complex (HCC) consisting of the Brownlee, Oxbow and Hells Canyon dams. By opinion and order issued by the Federal Power Commission (now FERC) on August 4, 1955, IPC was granted a license to construct and operate three hydropower projects in the Hells Canyon reach of the Snake River. While separate applications were filed for each of the projects, the three were consolidated in the order issuing the license and have since been collectively referred to as the HCC, FERC Project No. 1971. The three facilities are located at RM 247-Hells Canyon Dam, RM 273-Oxbow Dam and RM 285-Brownlee Dam. The Brownlee facility, uppermost of the three, is the primary storage reservoir for IPC. The HCC is located on the Snake River upstream from Lewiston, Idaho and four lower Snake River Federal dams (Ice Harbor, Lower Monumental, Little Goose, & Lower Granite).

The current FERC license for the HCC expires in 2005. IPC is presently engaged in a relicensing process initiated in accordance with applicable FERC regulations. As part of this process IPC has initiated a collaborative process involving State and Federal resource agencies, Native American Indian Tribes and numerous smaller public and private interests. In preparation for the filing of a license application, IPC has also initiated various aquatic studies relating to the HCC. These studies were developed in accordance with FERC regulations with input from collaborative team members, including some of the agencies represented on the Federal Caucus. IPC anticipates that the majority of the studies will be completed by 2001 in order to allow for the preparation of a draft license application by late that year or early 2002.

In general, IPC believes that the draft FCRPS BO and All-H Paper commit three principal errors. First, the premise that flow augmentation from the upper Snake River is efficacious is wrong. Second, a party's responsibility for any loss of the fishery should correlate with its contribution to recovery efforts. Third, as to the HCC and Upper Snake, theory has been allowed to outstrip science.

FLOW AUGMENTATION

The National Marine Fisheries Service and other members of the Northwest Federal caucus have consistently advocated flow augmentation from the Upper Snake River as a key component of salmon recovery. They have done so even in the face of studies by their own agency and by some State government officials that indicate the contrary. The assertion that flows from the Upper Snake River are efficacious is wrong—it is wrong both generally, in terms of the alleged correlation between flows from all of Idaho and fish survival, and specifically in its assertion that the HCC operations could substantially assist salmon survival in the lower Snake and Columbia rivers. IPC has reviewed previous comments submitted by the Idaho Water Users Association and Committee of Nine to the draft FCRPS BO and All-H Paper and supports their prosition that the use of Upper Snake River water for flow augmentation will neither reverse the decline nor aid in the recovery of listed species. IPC also concurs with the State of Idaho's comments to on the All-H paper denouncing flow augmentation as a valuable tool for salmon recovery.

This is not to say that flows in Snake River may not affect anadromous and native fish in the Snake River. In 1991, IPC implemented the Fall Chinook Recovery Plan to address flow and operational issues that might affect fall chinook habitat below the HCC. IPC is also presently conducting a study in connection with relicensing (Hells Canyon Instream Flow Assessment) to explore issues relating to flows and operations at the HCC and the effects upon not only fall chinook but also white sturgeon and native salmonids (bull and redband trout) present in the Hells Canyon reach. This study, together with other studies and analysis, will be completed through the HCC relicensing process and will provide a scientific and reasoned basis upon which to assess the effects of the flows and the HCC on fishery resources.

RESPONSIBILITY COUNTS

IPC believes the FCRPS BO and All-H paper are mis-focused and as a result and will fail in their intended goal to restore listed endangered fish as prescribed by the Endangered Species Act. The documents rely too heavily on habitat improvements in Idaho and on the unproven experiment of flow augmentation measures from Idaho's Upper Snake River and de-emphasize the impact on downstream impacts. Existing spawning habitat in Idaho is in good condition and is adequate to support recoverable levels of listed species. While habitat improvements may be of obvious benefit, improvements in this area will not result in the intended recovery levels desired by the documents or the ESA. IPC believes the documents should direct more intense efforts on downstream activities such as estuary improvements, fish passage improvements at the four lower snake dams, predation, and commercial and tribal harvest.

In this context, those interests who have not adversely impacted the fisheries resources should not be made to bear a disproportionate amount of the pain for assisting in their recovery. The draft FCRPS BO and All-H Paper, however, propose in large part to assign equal responsibilities for remediation to all members of the Snake River's community. This is inequitable for all Idaho interests. IPC has addressed past effects of the HCC on fishery resources through the 1980 Settlement Agreement and continues to address current or potential effects of the HCC through the Fall Chinook Plan and ongoing studies initiated in the connection with relicensing. It has also cooperated with the implementation of measures under the 1995 Biological Opinion which were intended to avoid jeopardy of the FCRPS. (IPC has been reimbursed for some, but not all, of the costs associated with these latter efforts because the measures implemented were to mitigate for impacts not attributable to the development and operation of the HCC. 16 U.S.C. section 839(h)(11)(A).)

Another example of using a broad brush in assessing contribution without addressing responsibility relates to the general Federal goals for a regional fish recovery plan. In large part, the goals are in conflict, at least in the context of ESA recovery concepts. One goal is to conserve the species—avoid extinction and foster long-term survival and recovery. Another is to assure Tribal fishing rights—restore salmon and steelhead over time to a level that provides a sustainable harvest. Neither the draft FCRPS BO nor the All-H Paper specifies the level of recovery necessary to achieve either of these goals, but it seems likely that the level necessary to sustain a tribal harvest is far greater than that necessary for conservation of the species. This raises serious questions as to whether non-Federal interests can be compelled to contribute to recovery goals that may go beyond necessary conservation measures and address Federal trust or treaty responsibilities to Native American Indian Tribes.

THEORY SHOULD NOT OUTSTRIP SCIENCE

While conceptual planning is important, the draft FCRPS BO and All-H Paper have a tendency to allow theory to outstrip study efforts that were designed to formulate in a careful, cooperative manner a plan to address fisheries issues on the basis of the best scientific and commercial data. This ignores the dynamic, interactive character of the processes unfolding in the basin. Prejudgment is neither good science nor prudent politics, both of which are essential in crafting an appropriate and acceptable approach to the difficult questions our region's fisheries present. IPC would urge the Federal interests to not allow the process of building a conceptual recovery plan to outstrip other Federal, State or regional processes that are proceeding parallel to that effort and that may, if considered, aid in identifying viable recovery and conservation alternatives. This is even more critical in light of the electrical energy situation in the northwest and west in general. Clearly, recent events of this past year in California and northwest markets have indicated that the region is short of electrical supply. This has obvious effects on energy prices and negative

reverberations in the economy. According to the Northwest Power Planning Council, the region needs an additional 3,000 megawatts of generating resources by 2003 to lesson the risk of critical power shortages during peak periods. Hydropower plays a critical role in the northwest energy markets as a whole and plays an equally critical role in maintaining reliability because of its unique nature to follow load and ancillary ability to maintain voltage support. With this situation not likely to correct itself any time soon, putting Federal and non-Federal hydropower at risk by recommending unsound scientific remedies is irresponsible.

SUMMARY

The draft FCRPS BO and All-H paper attempt to recover listed fish by expanding beyond the Federal hydropower system and implement a strategy based on improvements to hatcheries, habitat, and harvest. Unfortunately, the strategy places too much emphasis on improved habitat in the upstream spawning areas where excellent habitat already exists. The plan also falters by attempting to implement what is largely a political strategy by continuing to call for additional upper Snake river flow augmentation water even though the science concludes other wise. The documents need to be amended to focus on areas where immediate improvements will have the greatest and more immediate chance to meet recovery goals, such as Lower Snake and Columbia fish passage improvements, such as those suggested by the four Northwest Governors. The documents should also focus on mixed stock harvest issues, estuary habitat improvements and predation.

Thank you for this opportunity to provide comments on this paramount issue for the northwest's future.

